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[COMMITTEE PRINT]

THE TRAGEDY OF MULTIPLE DEATH NURSING
HOME FIRES: THE NEED FOR A NATIONAL
COMMITMENT TO SAFETY

R E P O R T

BY THE

SUBCOMMITTEE ON HEALTH AND
LONG-TERM CARE

OF THE

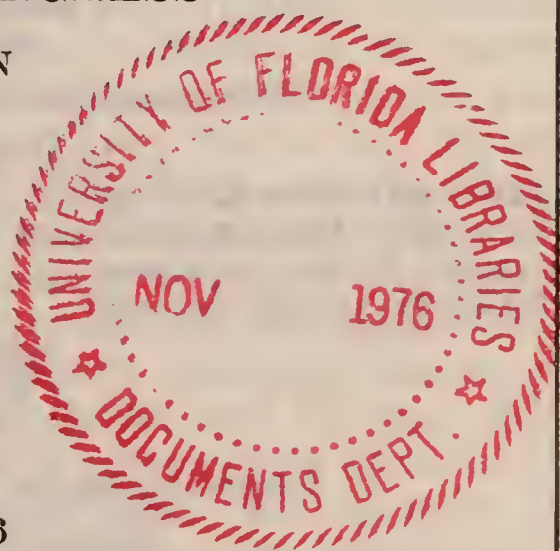
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MEMORANDUM

To: Members of the Subcommittee on Health and Long-Term Care,
Select Committee on Aging.
From: Claude Pepper, Chairman.
Re: Nursing Home Fire Safety Report.

As part of its continuing examination of the health care problems of the elderly, the Subcommittee on Health and Long-Term Care has investigated the fire safety problem of nursing homes. Multiple death fires in nursing homes are a national tragedy which can and must be eliminated. Elderly residents of nursing homes are entitled to a safe environment.

This study is based on an intensive investigation by the Subcommittee, including a joint hearing with the Senate Subcommittee on Long-Term Care on June 3, 1976, on two recent tragic nursing home fires in Chicago which killed 32 people and injured 50 others, as well as similar fires elsewhere. In addition, a special investigation was conducted by the U.S. General Accounting Office at my request.

Witnesses at the June 3 hearing included: Reverend William Pollard, Chapel Reverend, Wincrest Nursing Home; Dr. Paul Hurwitz, Examining Physician, Wincrest Nursing Home; Mr. Charles Chandler, Administrator, Cermak House Nursing Home; Mr. James D. Martin, Deputy Director, Manpower and Welfare Division, U.S. General Accounting Office; Mr. Robert E. Iffert, Assistant Director, Manpower and Welfare Division, U.S. General Accounting Office; Mr. Alan S. Zipp, Project Manager, Manpower and Welfare Division, U.S. General Accounting Office; Dr. Faye G. Abdellah, Director, Office of Long-Term Care, Department of Health, Education, and Welfare; Mr. Marvin Hitt, Director, Office of Long-Term Care Standards Enforcement, Department of Health, Education, and Welfare; Mr. Michael Morelli, Office of Long-Term Care, Department of Health, Education, and Welfare; Mr. John Morehart, Office of Facilities, Engineering, and Property Management, Department of Health, Education, and Welfare; Mr. Gene Haislip, Deputy Assistant Secretary for Legislation, Department of Health, Education, and Welfare; Mr. George Hipps, Acting Director, Office of Underwriting Standards, Department of Housing and Urban Development; Mr. Richard L. Best, Fire Analysis Specialist, National Fire Protection Association; Mr. Martin Grimes, Assistant Vice President, National Fire Protection Association; and Mr. Ross Richardson, Assistant Illinois State Fire Marshal. In addition, I wish to thank Mr. Francis Murphy, Chief of the Chicago Fire Prevention Bureau, who gave valuable testimony at the August 12, 1976, Chicago field hearing of the Subcommittee on Retirement Income and Employment, chaired by our distinguished

colleague, Wm. J. Randall, Chairman of the full House Select Committee on Aging.

To all of these individuals, agencies, and groups, I wish to extend my thanks. In addition, I wish to commend and thank Mr. Alan S. Zipp of the General Accounting Office for his very valuable assistance in the preparation of this report, and I would like to thank the Honorable Elmer B. Staats, U.S. Comptroller General, for allowing Mr. Zipp to assist the subcommittee in this important area. I would also like to thank the following people for their assistance: Mayor Richard Daley of Chicago; Congresswoman Cardiss Collins of Chicago; Congressman Frank Annunzio of Chicago; Mr. J. Thomas Hughes, National Fire Prevention and Control Administration; Mr. Irwin Benjamin, National Bureau of Standards; and Ms. Janet Kline, Congressional Research Service, Library of Congress.

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SUMMARY OF FINDINGS AND RECOMMENDATIONS—THE TRAGEDY OF MULTIPLE DEATH NURSING HOME FIRES: THE NEED FOR A NATIONAL COMMITMENT TO SAFETY

The Subcommittee on Health and Long-Term Care of the House Select Committee on Aging has conducted an extensive investigation of nursing home fire safety. Two nursing home fires, during early 1976, in Chicago, resulted in the deaths of 32 elderly residents and injuries to 50 others. On June 3, 1976, a joint hearing on these and other recent fires was held by the House and Senate Subcommittees on Long-Term Care.

At the request of the House Subcommittee on Health and Long-Term Care, the United States General Accounting Office made an independent investigation of the two Chicago fires. The GAO report was released at the June 3 hearing. The GAO found that both nursing facilities met all Federal fire safety requirements, but neither home was protected with an automatic sprinkler system. The GAO concluded that Federal fire safety requirements do not insure life safety in nursing home fires. The GAO recommended that the Congress enact legislation which will require that all nursing homes be fully protected with automatic sprinkler systems.

The subcommittee found:

Nursing homes require special consideration because residents are generally incapable of self-preservation due to age, and physical or mental illness; and that neither adequate staff nor time is available to evacuate all residents during a fire. The subcommittee found that there has never been a multiple death fire in any nursing facility fully protected with an automatic sprinkler system. Experts agree that automatic sprinkler systems are the most effective known method to prevent multiple death fires in nursing facilities. (See pp. 5-6.)

Another Chicago nursing home fire, within weeks of the two tragic fires, was quickly extinguished, with no loss of life or injury, because of an automatic sprinkler system. A professional engineering firm's investigation of the Chicago fires concluded that "no single additional protective measure except an automatic sprinkler system would have definitely prevented this high loss of life." (See pp. 9-10.)

As a result of the Chicago fires, the City of Chicago enacted a City Ordinance requiring all Chicago nursing facilities to install automatic sprinkler systems. (See pp. 10-11.)

Experts agree that smoke detectors and heat detectors only give notice that there is a fire, but take no action to extinguish the fire. Sprinklers detect a fire, give an alarm and either extinguish or hold a fire in check until outside aid arrives. (See p. 11.)

The National Bureau of Standards of the Department of Commerce reported that its Center for Fire Research has concluded that "full protection by automatic sprinklers in nursing homes is the best known way to prevent disastrous multiple death fires." (See p. 11.)

Test after test and report after report concludes that the single most effective method of limiting the disastrous effects of fire is through complete automatic sprinkler protection. (See pp. 9-17.)

The National Fire Prevention and Control Administration of the Department of Commerce strongly advocates that all nursing homes be provided with automatic sprinkler protection throughout. (See p. 13.)

The cost of requiring all nursing homes to be fully protected with automatic sprinkler systems is about 19¢ per bed (patient) per day according to the General Accounting Office. The total national cost has been estimated from \$256 million to \$412 million, including over 8,000 Medicare and Medicaid nursing facilities (out of a total of 16,500) currently without sprinklers. This ranges from \$32,000 to \$50,000 per nursing home for a permanent capital improvement. (See pp. 20-23.)

Direct Federal loans to nursing facilities to pay for automatic sprinklers is the most expedient method to insure the availability of funds. The loans should be repaid over 20 years with interest not to exceed 6 percent. (See p. 24.)

Savings will occur in fire insurance premiums for a fully sprinklered building and its contents. (See p. 27.)

All alternatives to full automatic sprinkler protection compromise the necessary level of nursing home fire safety and are of questionable cost effectiveness. While the subcommittee acknowledges that automatic sprinklers have only limited effectiveness in preventing single deaths of persons intimate with a fire, such as persons smoking in bed, automatic sprinklers can almost totally, if not totally, eliminate multiple death nursing home fires. (See pp. 29-31.)

The subcommittee recommends that the Congress enact legislation requiring all nursing homes participating in Medicare or Medicaid to be fully protected with an automatic sprinkler system and to provide direct low interest loans to facilities for sprinkler installation. (See p. 36.)

THE TRAGEDY OF MULTIPLE DEATH NURSING HOME FIRES: THE NEED FOR A NATIONAL COMMITMENT TO SAFETY

INTRODUCTION

Every year there are between 3,500 to 4,000 nursing home fires. Throughout the years, thousands of our nation's elderly people have been senselessly killed in nursing home fires, and thousands more have been injured. An average of 50 people are killed annually in multiple death nursing home fires, and over 500 are killed annually in fires involving one or two people. Hundreds more are injured as a result of these fires each year. Millions of dollars in damages are realized on a recurring basis. In 1974, over \$5.9 million was lost in direct property loss from 9,300 nursing home fires.

On June 3, 1976, the House and Senate Subcommittees on Long-Term Care held a joint hearing to investigate two nursing home fires in which 32 people were killed and 50 injured. Both fires occurred in the Chicago area early in 1976. The subcommittees heard testimony from witnesses present at the fires; experts from the Chicago Fire Department; representatives from the Departments of Health, Education, and Welfare, and Housing and Urban Development; investigators from the General Accounting Office; and fire protection engineers from the National Fire Protection Association.

The conclusion of much research is that an automatic sprinkler system is the most effective known method to prevent multiple death fires. Many reports, both by congressional committees and others, have recommended that, to save lives in cases of fire, all nursing homes should be required to have automatic sprinkler systems.

It is argued that automatic sprinklers have only limited effectiveness in preventing single death fires and consequently should not be required in all nursing facilities. The subcommittee recognizes that the state-of-the-art in fire technology in protecting lives in single death fires is limited, particularly where a person is in bed asleep when the bed catches fire. While the subcommittee is very concerned with single death fires, it firmly believes that the problem of multiple death fires can and should be eliminated as soon as possible. The country has the technology and the Congress has the authority to prevent multiple death nursing home fires.

It is also argued that the cost of automatic sprinklers is too high to justify such a requirement. The subcommittee believes the cost of needless death and injury is too high to justify not requiring sprinklers. Three states, California, Massachusetts, Ohio, and the City of Chicago, have enacted laws requiring all nursing homes under their jurisdictions to be fully protected with automatic sprinkler systems.

The subcommittee asked the U.S. General Accounting Office to conduct a thorough, independent, and objective investigation of the two

Chicago nursing home fires and to make recommendations to prevent this kind of tragedy from reoccurring. The GAO concluded that current nursing home standards do not insure life safety in cases of fire. It recommended that all nursing homes be fully protected with automatic sprinkler systems.

Over the years, Congressional hearings have been held time and again, to find out why so many people have been killed in nursing home fires. In 1973 there were 6,400 nursing home fires, causing \$3.6 million in property damages. In 1974, the National Fire Protection Association reported there were 9,300 nursing home fires, causing over \$5.9 million in damages. These fires, during 1973, killed 51 people in multiple death fires and about 500 in single death fires. During the first two months of 1976, two nursing home fires resulted in the deaths of 32 people.

Report after report has been published with findings that there is a need for a system which acts automatically to prevent death in nursing home fires. The subcommittee agrees with this finding and strongly recommends that the Congress enact legislation to require automatic sprinklers in all federally funded nursing facilities. H.R. 14406 is a bill, introduced by the subcommittee chairman, which is designed to solve the problem of multiple deaths in nursing homes. A copy of this bill is attached as an appendix to the subcommittee report.

The matter of multiple deaths from fire in nursing homes has been discussed and investigated far too long. Action must be taken now. Even while this report was being written, another nursing home fire, in Roanoke, Va., killed four people and injured 28 others. The Congress must take the initiative because the States have not acted. Automatic sprinklers in all nursing homes can prevent multiple deaths from fire from ever occurring again.

This report presents the results of the subcommittee's investigation and draws upon evidence provided by many others in concluding that there is a real need for automatic sprinkler systems. The subcommittee hopes that action will be taken soon in this matter before more innocent people are senselessly and needlessly killed by fire in nursing homes.

BACKGROUND: CHICAGO NURSING HOME FIRES

Hundreds of pages of testimony have been received by various congressional committees on the subject of nursing home fire safety. In 1967, the Congress required that all nursing homes comply with the Life Safety Code in an effort to insure a high level of fire safety for nursing home residents. Subsequent to that action numerous fires have occurred killing hundreds of innocent, helpless people, many in nursing homes which do not comply with the Life Safety Code requirements.

In early 1976, two nursing homes near Chicago had fires which resulted in the deaths of 32 helpless elderly citizens. The Wincrest Nursing Home is located in Chicago's north side. The four-story building was of fire resistive construction with a protected noncombustible roof. The building had enclosed stairways. Heat detectors were provided in the chapel, stairways, and some closets, and one smoke detector in the corridor near the entrance to the chapel. Approximately 42 of the occupants of the building were in the chapel on the top floor on January 30, 1976, when a fire in one of the patient's rooms on that floor filled the corridor and chapel with heat and smoke. Reportedly, a staff member of the nursing home had been charged with setting the fire.

The fire started in the area of a wooden clothes wardrobe and ultimately involved the contents of the entire room. Two wardrobes were side by side constructed of plywood with hinged folding doors. Mattresses were innerspring units consisting of 69 percent cotton felt and 31 percent sisal pad. These combustible contents contributed to fire growth and development. In addition, the wallpaper on sleeping room walls consisted of vinyl wall covering, which may have contributed to the smoke production.

Fire damage was limited to the room of origin and the top portion of a closet door across the corridor. The corridor opposite the room of origin sustained heavy heat damage adjacent to and in both directions from the room of origin.

Thirty-five elderly residents were hospitalized as a result of the fire. Thirteen patients died initially, but others had died after the fire, for a total of 24 dead. No fatalities occurred in the room of fire origin, which was unoccupied at the time of the fire. All residents who died—with the possible exception of two—were located in the chapel.

The Cermak House is located in Cicero, Ill., immediately west of Chicago. The Cermak House fire occurred on February 4, 1976, less than one week following the Wincrest Nursing Home fire. This modern nine-story intermediate care nursing home was of fire resistive construction with automatic closing smoke barrier doors in the corridors and corridor smoke detection. On each floor, smoke barriers divided the U-shaped building into a center section and an east and west wing. The west wing housed six patient rooms with four patients per room.

A fire in a fourth floor room filled the west wing of that floor with smoke and heat and caused the deaths of eight residents on that floor.

The fire started in the area of a combustible clothes wardrobe in room 421 at about 6:30 a.m. At this time, the patients were being awakened and were beginning their daily routine. The cause of the fire had been attributed to a faulty electrical cord to the lamp on the nightstand between the bed and the wardrobe. Combustible material in the room contributing to the fire included mattresses containing 50 percent polyurethane foam plastic and chairs padded with urethane foam plastic.

No fatalities occurred in the room of fire origin. The three occupants of this room were removed by the nursing home staff. The fatalities were from rooms in the wing of origin, except one from the center section who apparently received exposure to smoke during evacuation. Reportedly, this person was suffering from respiratory illness. The corridor smoke doors worked as designed and contained most of the heat and smoke in the wing of origin. Fire damage was limited to the room of origin. Smoke and heat damage extended throughout the wing, with smoke damage in those rooms with doors open. The carpeting in the room of origin was consumed, but the carpeting in the corridor did not burn.

Reports of the Cook County Coroner's Office had been reviewed for 30 of the 32 victims of both fires, and they showed that the victims died of smoke inhalation or smoke inhalation complicated by respiratory problems.

Thirteen of the Wincrest victims died on the day of the fire, and all 13 deaths were attributed to smoke inhalation by the coroner's physician. Most of the 11 other casualties died during the next two weeks from smoke inhalation complicated by respiratory problems—including pneumonia—or heart condition. The average age of these victims was 80 years.

The coroner's report of the four Cermak victims who died on the day of the fire showed the deaths as smoke inhalation. The other four residents died later. In three cases, the cause of death was listed as smoke inhalation. In the fourth case, the victim died of smoke inhalation and extensive burns. The average age of the victims was 75 years.

The Wincrest and Cermak fires exhibited similar characteristics in their place of origin, contents involvement, rapid growth and development and smoke spread resulting in untenable conditions and tragic results.

Both the Wincrest Nursing Home and the Cermak House fires originated in a resident's sleeping room. The combustible contents of the sleeping rooms at both fires contributed to the severity of the fires and to the large quantities of toxic smoke produced.

Fire damage was essentially confined to the room of origin. The construction of the walls, floors, and ceilings was adequate to confine the fire to these rooms. The door openings between the rooms and corridors were the weak links, allowing the spread of smoke and toxic gas, resulting in the tragic multiple fatalities. Neither home was protected by an automatic sprinkler system.

CHAPTER 1

THE NATURE OF FIRE PROTECTION

Fire is the best of all servants; but what a master!—THOMAS CARLYLE, *Scotch Essayist*.

The 1942 Cocoanut Grove Night Club fire in Boston, in which 492 lives were lost, focused national attention upon the importance of adequate exits and related fire safety features. Public attention of exit matters was further stimulated by a series of hotel fires in 1946 (La-Salle, Chicago—61 dead; Canfield, Dubuque—19 dead; and the Wine-coff, Atlanta—119 dead).

Under the Social Security Act, fire protection requirements for nursing homes are directed by the 1967 and 1973 editions of the National Fire Protection Association's Standard 101 Life Safety Code. The Life Safety Code had its origin in the work of the Committee on Safety to Life of the NFPA which was originally organized in 1913. For the first few years of its existence the committee devoted its attention to a study of the notable fires involving loss of life and to an analysis of the causes of this loss of life. This work led to the preparation of standards for the construction of various items such as stairways and fire escapes, for fire drills in various occupancies, and for the construction and arrangement of exit facilities for factories, schools, and other buildings, which form the basis of the present Code.

The Life Safety Code has been mandated by Act of Congress as a requirement for nursing homes participating in Medicare and Medicaid.

INSTITUTIONAL OCCUPANCIES REQUIRE SPECIAL CONSIDERATION

Institutional buildings are those used for purposes such as medical or other treatment or care of persons suffering from physical or mental illness, disease or infirmity. Institutional buildings provide sleeping facilities for the occupants and are mostly occupied by persons who are incapable of self-preservation due to age, physical or mental disability, or security measures not under the occupants' control. Institutional buildings include hospitals, nursing homes, and homes for the aged.

According to the Life Safety Code, all institutional buildings shall be so designed, constructed, maintained, and operated as to minimize the possibility of a fire emergency which requires the evacuation of occupants. The safety of occupants of institutional buildings cannot be assured adequately by dependence on evacuation of the building, so their protection from fire shall be provided by appropriate arrange-

ment of facilities, adequate staffing, and careful development of operating and maintenance procedures composed of the following: Proper design, construction and compartmentation; provision for detection, alarm, and extinguishment; and fire prevention, and the planning, training, and drilling in programs for the isolation of fire and transfer of occupants to areas of refuge or evacuation of the building.

EVACUATION OF NURSING HOME RESIDENTS IS JUST NOT PRACTICAL

According to Dr. Paul Hurwitz, a physician present at the Wincrest fire, evacuation is simply not practical. At the June 3, 1976, subcommittee of occupants to areas of refuge or evacuation of the building.

I think it is well to point out that if we were to go right now, to any nursing home, and drag 30 people down from the third floor it would kill a substantial number. I think we have to remember, and remember throughout the day, that evacuation is really futile. It is a waste of personnel because of the importance of time. This thing took place in such a short number of minutes that we had to limit our efforts to those which would save lives. Evacuation will not save lives.

The physician continued:

* * * that to move a patient without hurting a senile, fragile body requires two members of the staff over a couple of minutes. When you think of the chaos and the pandemonium that reigned under the circumstances, you must remember you are dealing with human elements and you have to remember that people are not functioning quite on the level that they would in a drill.

As was pointed out in Senate Report 94-00, published in August 1975, by the Subcommittee on Long-Term Care of the Senate Special Committee on Aging, many patients are under sedation or bound with restraints. The report stated further that nursing home patients present a particular problem because of several factors: (1) their advanced age (average 82), (2) their failing health (average four disabilities), (3) their mental disabilities (55 percent are mentally impaired), (4) their reduced mobility (less than half can walk), (5) their sensory impairment (loss of hearing, vision, or smell), (6) their reduced tolerance to heat, smoke, and gases, and (7) their greater susceptibility to shock.

Although the primary approach to nursing home fire safety has been to confine the fire to permit adequate time to safely evacuate the patients, it is apparent that there was neither adequate time nor any assurance that evacuation would have prevented death at Wincrest. As pointed out, from both fires, time is the most critical factor. In both cases, only a short period of time passed from the identification of the fires to the point that a lethal environment was created.

The subcommittee concludes that evacuation should not be the primary emphasis in protecting the lives of nursing home residents in cases of fire. This approach cannot be relied upon because of the inadequate number of staff, the speed with which an effective evacuation must be accomplished, and the poor physical conditions of the residents. Evacuation should only be attempted when absolutely necessary.

CODE REQUIRES SMOKE DETECTORS AND AUTOMATIC SPRINKLERS IN MOST CASES

The 1973 Life Safety Code requires that all new nursing homes be fully equipped with an automatic smoke detection system. In addition, the Code requires that all nursing homes be fully protected with an automatic sprinkler system, except for those buildings of fire resistive or one-story protected noncombustible construction.

During the subcommittee's June 3, 1976, hearing, Mr. Richard L. Best, fire analysis specialist for the National Fire Protection Association, testified that:

* * * automatic sprinklers which will both detect and control incipient fires as well as transmit the alarm signal to the fire department, must be considered. The record of automatic sprinkler performance is good. The NFPA records do not include any report of a multiple loss of life in a nursing home fully protected by automatic sprinklers. Life safety will be considerably enhanced by the installation of automatic sprinkler protection in any nursing home regardless of construction.

Mr. Best reported at the June 3 hearing the NFPA analysis of the fires at the Wincrest and Cermak nursing homes:

The basic multiple death fire safety problem in health care facilities, as exemplified by these two fires, is the failure to confine a fire's resultant heat and smoke to the room of origin. Fast-developing fires as occurred in the two Chicago area nursing homes produced large quantities of smoke and other toxic gases that escaped from the rooms of origin and caused occupant deaths within the area directly exposed by the smoke and heat of the sleeping room fires—the third floor and chapel at Wincrest and the west wing of the fourth floor at the Cermak House. The combustibility of the sleeping room contents intensified the problem, providing fuel for fast-developing and heavy toxic smoke producing fires. There was insufficient time for nursing home staff to safely evacuate the occupants from the area directly exposed by the smoke and heat of the sleeping room fires.

Time is of the essence. There is a need to slow the development of the fire or at least confine its effects somehow; by reducing the amount of combustibles, by closing the door to the room of origin, by eliminating or controlling the smoke or by extinguishing the fire. These measures will buy the necessary time for staff to evacuate occupants to an area of safety. The technology is available to prevent multiple death fires from happening. Complete sprinkler protection in all nursing homes regardless of construction in conjunction with other protective features is one solution that would significantly reduce the risk of multiple life loss.

HOW AUTOMATIC SPRINKLERS PREVENT DEATH FROM SMOKE

According to experts from the National Fire Protection Association:

Sprinklers have an excellent record of extinguishing fires. Although there can be smoke generated in the incipient stage of a fire, and additional smoke developed even though the fire is controlled by the sprinklers, the sprinklers will reduce the amount of smoke produced in a fire. As in Wincrest, had there been sprinkler protection in the room, even if the fire had not been completely extinguished at the wardrobe, it would have prevented the burning of the rest of the contents in the room. It would have reduced the overall amount of smoke.

Sprinklers will react when the critical temperature occurs, but that allows a sufficient time for a fire to begin to develop before it operates. The sprinkler

then operates over the fire and it may completely extinguish the fire. But if it is something like a mattress or chair, it might continue to smoke, but it will not spread. Some smoke will go through the building, however, it will be cool smoke because it had to pass through a spray of water. It will not have pressure or the ability to travel very far and probably would not have a lethal effect. It might irritate, but it would not have so much lethal gas.

SUMMARY

Nursing home residents cannot be expected to evacuate themselves in cases of fire. The speed with which a fire can develop and cause death prevents evacuation from being considered as a first line of defense in a nursing home fire situation. The most reliable and effective method of insuring life safety is early detection and prompt extinguishment of the fire through automatic means without the need for human reaction or judgment. The subcommittee believes that automatic sprinkler systems which can detect and extinguish fires are the most effective method of preventing multiple death fires in nursing homes.

CHAPTER 2

THE CASE FOR AUTOMATIC SPRINKLERS

U.S. GENERAL ACCOUNTING OFFICE

At the House-Senate joint subcommittees' hearing of June 3, 1976, the United States General Accounting Office released the results of an investigation requested by Chairman Pepper, of the Wincrest, Cermak, and other recent nursing home fires. The General Accounting Office report entitled "Federal Fire Safety Requirements Do Not Insure Life Safety in Nursing Home Fires," recommended that "the Congress enact legislation which will require that all nursing facilities be fully protected with an automatic sprinkler system."

The Comptroller General's General Accounting Office report cited a nursing home fire case, occurring within weeks of the Wincrest and Cermak House fires which resulted in no injuries, deaths, and little damage because of an automatic sprinkler system. The GAO report stated:

* * * the Plaza Nursing Home fire occurred on February 18, 1976. The Plaza Nursing Home, a skilled nursing facility in Niles, Illinois, can accommodate 300 residents. At the time of the fire, 224 residents, including both Medicare and Medicaid patients, occupied the home.

A nurses' aide noted smoke and a burning mattress in room 421 (no one was in the bed) and, with a nurse's assistance, evacuated the three occupants of the room. The nurse activated a pull-box alarm and closed the room door. The fire activated one of two sprinklers in the room which sprayed water on the fire. The sprinkler extinguished the fire before the firemen arrived, which was shortly after the alarm.

The fire did not cause any deaths or injuries to residents at the Plaza Nursing Home. Fire damage was confined to the mattress and little, if any, heat or smoke damage occurred.

The Fire Chief attributed the absence of injuries and the prompt control of the fire to the sprinkler system and the quick employee response. Because the fire was promptly controlled, it did not generate sufficient heat (160 degrees Fahrenheit) to activate the second sprinkler in the room.

An official of the Illinois Fire Marshal's office attributed the cause of the fire to the careless use of smoking materials by a resident.

GAGE-BABCOCK & ASSOCIATES, INC., ENGINEERS/CONSULTANTS

At the request of the American Health Care Association (formerly the American Nursing Home Association), Gage-Babcock & Associates, Inc., was asked to investigate the Wincrest and Cermak House fires.

The engineering firm's report on the Wincrest fire concludes that:

* * * no single additional protective measure except an automatic sprinkler system would have definitely prevented this high loss of life. Other protective measures would have still depended on specific staff and fire department reactions. Early warning smoke detectors would not have provided any significant benefit since there was no evidence that delayed alarm transmission contributed to the loss. Fire tests have shown that a wooden wardrobe fire can develop very

rapidly and involve an entire room within a few minutes. Automatic door closers would have quickly dampened the fire and provided time to evacuate occupants if the door to the fire room was kept closed. This would have required both the staff and the fire department to refrain from extinguishing the fire until all occupants were removed to a place of safety.

Doors on the chapel, which are required under the 1973 Life Safety Code, would have impeded smoke entrance. The chapel would have remained tenable if these doors remained closed and some chapel windows were opened. However, if either the staff, or the fire department attempted to "rescue" the occupants of the chapel it would negate the benefit of the doors. In addition, "rescue" efforts would have required moving the patients toward the fire area. A second exit stairway from the chapel would have been of little benefit since most patients could not have used it. It would have probably reduced the loss of life somewhat since rescue would have been easier.

The engineering firm's report on the Cermak House fire concluded that:

* * * the fire resistive construction did not contain the fire any better than protected wood frame construction would have. An automatic sprinkler system would have promptly suppressed this fire. Patient room door closers would have contained the fire and since all patients would have been in rooms behind closed doors, the life loss might have been prevented. This would have required that neither the staff nor the fire department would have evacuated patients until the fire was suppressed and the floor ventilated. In addition, the patient rooms near the fire room would have had to be ventilated to prevent buildup of smoke, which would come through the walls. There was time for all of this to have been done by the staff instead of attempting evacuation. However, the universal tendency and training is, and probably will remain, to evacuate all occupants at least on the fire floor. As long as codes and training emphasize fire fighting and having ample fire extinguishers available, the staff will continue to attempt to extinguish fires rather than closing a fire room door.

SPECIAL INVESTIGATION ORDERED BY CHICAGO MAYOR

Mayor Richard J. Daley appointed a special panel to investigate and record all facts related to the fire and subsequent deaths which occurred at the Wincrest Nursing Home on January 30, 1976, and to draw such conclusions as are supported by the facts and to make recommendations to prevent a similar tragedy from recurring. The investigation concluded that:

No matter what the cause of ignition, this fire demonstrates that a modern, well-built, well-maintained nursing home that complies with present regulations is still vulnerable to a disaster of this magnitude.

There was no evidence of panic. The problem lay with the inability of the elderly residents to evacuate themselves from the fire floor, and the difficulty of moving wheel-chair patients down the available stairs.

Occupancies of this type must be capable of protecting the residents during the course of a fire without relying on evacuation.

Limiting combustible items, furniture and bedding would not entirely solve the problem and would be in part dehumanizing.

Providing self-closers on corridor doors held in the open position with magnetic hold open devices activated by smoke detectors would be an inadequate form of protection for institutional sleeping rooms. These devices are too subject to various types of failure and could prove dangerous to older people who may accidentally bump such a door, releasing the self closer. Facing the practical operational realities, wedges and furniture would very likely be placed to negate the effectiveness of the door closers. In addition, self closing devices activated by smoke may trap a number of residents in the fire room making it difficult for them to exit themselves or with attendants' assistance. Also, these devices are by no means an inexpensive solution in both their initial and maintenance cost.

Smoke detectors or heat detectors only notify that there is a fire. Many of the people in nursing homes cannot take proper action, themselves, but must

then rely on attendants. There are not normally enough attendants to move all threatened residents to a safe enough location to endure the fire, smoke, and gases that may develop in an uncontrolled fire before the arrival of the fire department.

Smoke barriers in corridors protect the occupants on the non-fire side but are not a solution for those on the fire side.

The proper emergency action of attendants is important but again is not a complete solution. Their decision to fight a fire or use that time to remove residents from a dangerous area must be made in split seconds. Should the fire proceed beyond their control, they must have enough time and training to remove all affected people to a safe area. Quite often that time is not available or the training is inadequate.

Sprinklers detect a fire, give an alarm and either extinguish or hold a fire in check until outside aid arrives. They also control, indirectly, the amount of smoke generated. They would limit a fire to a size that would be controlled by attendants and would also provide the time necessary to remove residents to a safe area. They will not, however, prevent fire nor will they prevent a person in the immediate vicinity of a fire from being affected by that fire. They will, however, protect other residents by controlling the fire and thereby the smoke, gas, and heat, and will also give attendants the time necessary to affect the immediate relocation of threatened individuals.

The recommendations of the investigation panel included that:

* * * the following requirements should immediately be made part of the Building and Fire Ordinances of the City:

Sprinkler systems to be installed in all new and existing nursing homes and be electrically interconnected with the fire alarm system.

On April 7, 1976, this recommendation was approved by the City Council. It requires all Chicago nursing homes to install sprinkler systems by February 1, 1977.

NATIONAL BUREAU OF STANDARDS OF THE U.S. DEPARTMENT OF COMMERCE

In commenting on the General Accounting Office report recommending that all nursing homes be required to install automatic sprinkler systems, the National Bureau of Standards made the following statements regarding multiple death nursing home fire safety:

The Center for Fire Research has reviewed the report and other available information. We make the following comments: "Full protection by automatic sprinklers in nursing homes is the best known way to prevent disastrous multiple death fires. The Center concludes that the recommendation for full sprinkler protection in nursing homes will, if fully implemented, prevent most and perhaps all multiple death fires; however, the effectiveness of an automatic sprinkler system in preventing or minimizing the individual fire death problem in health care facilities is limited."

The Bureau of Standards also proposed alternatives to full automatic sprinkler protection which are presented in Chapter 4.

AMERICAN HEALTH CARE ASSOCIATION: FULL SCALE FIRE TESTS CONTRACTED BY HEW

During the summer of 1974, the American Health Care Association (formerly the American Nursing Home Association), under contract to HEW, made a series of 14 monitored fire tests, some of which were carried out in an abandoned nursing home near Gary, Ind. The tests were conducted by Gage-Babcock & Associates, Inc., a fire safety engineering firm, with technical assistance of the Illinois Institute

of Technology Research Institute. This program was conducted for the Bureau of Quality Assurance, Department of Health, Education, and Welfare, by the American Health Care Association under contract.

Five of these tests were conducted in a fire test laboratory which was representative of a nursing home of fire resistive construction. Three tests were conducted in a vacated wood frame nursing home, and six in a modified apartment of brick-wood joist construction.

According to the American Health Care Association's report of the test results:

The primary conclusions of this program were that current fire safety construction standards and corridor wall construction having a one-hour fire resistance rating provide no significant life safety function in buildings protected by automatic sprinklers.

* * * * *

Automatic sprinklers readily controlled rapidly developing fires in patient rooms which were finished with Class C flamespread index prefinished plywood wall paneling and wood-fiber ceiling tiles (tests 9, 11, 12). In all of these tests the fire was largely shielded from direct contact with the sprinkler discharge. In addition, the room in tests 11 and 12 was cross-ventilated by opening two windows prior to starting the fire to reduce the accumulation of water vapor which might indirectly extinguish the fire. No lethal levels of temperatures (at the 5 ft. level) or carbon monoxide were recorded in these tests either inside or outside the burn room.

In tests 7 and 14, which were conducted to determine fire development without sprinkler protection, sprinklers in the fire room were manually actuated to terminate the test. Sprinkler operation quickly suppressed both well developed fires.

* * * * *

The conclusions of this program are directed to protection against the rapidly developing fire which poses a multiple life loss threat in an existing nursing home. The smoldering fire which generally poses a threat to a single life was not within the scope of the program.

The principal conclusion of the program was that ordinary noncombustible interior finishes commonly found in existing wood-frame and brick, wood-joist buildings provides adequate fire protection for the combustible structure in sprinklered buildings. * * *

With automatic sprinklers, the fire does not last long enough for its behavior to be affected even by Class C combustible wall paneling and ceiling tiles. * * *

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

At the joint House-Senate Subcommittees' hearing of June 3, 1976, Dr. Faye G. Abdellah, Director of the HEW Office of Long-Term Care and Special Assistant to the HEW Undersecretary for Long-Term Care, presented testimony regarding the HEW view of sprinkler systems in nursing homes. The following excerpts indicate the Department's position:

A very important point we would like to make is that the standards today provide only an acceptable degree of safety, not the maximum degree of safety.

* * * * *

The 1973 edition of the Life Safety Code does not require automatic sprinklers in buildings of fire resistive construction, regardless of height, as does the 1967 Code, and buildings up to three stories in height if they are of protected, non-combustible construction. There are other variations regarding construction types and sprinkler requirements in the 1973 Code.

* * * * *

The recent tragic fires in Illinois have raised serious questions as to the degree

of safety provided in institutions of fire resistive construction that are not required to have automatic sprinklers. These facilities were in compliance with the provisions of the Life Safety Code, yet 32 elderly residents perished. We in HEW are deeply concerned over these tragedies.

Over the past several years, there has been an increasing body of opinion which argues for requiring automatic sprinkler protection in all nursing homes without regard to type of construction. A few States such as California and Ohio and most recently the City of Chicago, require that all nursing homes have automatic sprinkler protection.

* * * * *

The Department has a contract with the National Bureau of Standards to study the effectiveness of many of the fire safety requirements pertaining to institutional occupancies and to determine whether additional or different requirements should be mandated. One of the things they are looking at is the placing of automatic sprinklers at selected locations rather than throughout a facility; there is no question that there is evidence to show that lives can be saved by automatic sprinklers.

* * * * *

Automatic sprinklers do help prevent multiple death fires. The NFPA has never reported multiple death fires in buildings which were completely sprinklered.

NATIONAL FIRE PREVENTION AND CONTROL ADMINISTRATION

The National Fire Prevention and Control Administration of the U.S. Department of Commerce, commented on the recommendation to the Congress that all nursing homes be required to have automatic sprinkler protection.

We strongly advocate that all nursing homes should be provided with automatic sprinkler systems throughout in accordance with the national consensus standard for sprinkler systems of the National Fire Protection Association (NFPA No. 13). We also urge that "trade offs" in building construction and equipment be encouraged when automatic sprinklers are provided as specified in the Life Safety Code also produced by the National Fire Protection Association (NFPA No. 101).

SENATE SPECIAL COMMITTEE ON AGING

In August 1975, the Subcommittee on Long-Term Care of the Senate Special Committee on Aging published a report "The Continuing Chronicle of Nursing Home Fires." The report pointed out that:

* * * few issues have stirred so much legislative and regulatory concern as fatal fires in nursing homes. On the Federal level, multideath tragedies of this kind have instigated investigations, hearings, and legislation intended to spur corrective action. In 1967, 1971, and 1972 significant action was taken by the Congress to raise safety standards to new and more satisfactory levels. But this supporting paper must report that serious gaps still exist in overall protection.

As is evident from prior fire experience, neither the patient nor the nursing home staff are capable of taking action to prevent loss of life in a major nursing home fire. Automatic detection systems are helpful, but the best fire safety approach incorporates automatic extinguishment as well as automatic detection. As Professor Irving Einhorn of the University of Utah has stated: "No single system is foolproof but, by and large, sprinklers are the difference between life and death. They are the difference between heavy and light property loss as well." By and large, most experts agree that in the nursing home context, the best technological solution to fire safety is a fully automatic sprinkler system.

After the NFPA staff investigation of the Marietta fire, Mr. Richard Stevens, Assistant Vice President for Standards of the National Fire Protection Association testified that: "I think the sprinkler would have stopped all production of smoke and fire once it had operated in that room; plus, of course when this happens, that is the end of everything."

Testifying with respect to the Salt Lake City fire, Mr. Willey of NFPA stated: "In my opinion, these deaths at the Lil-Haven Nursing Home would not have occurred if automatic sprinkler protection had been provided."

In both the Marietta and Salt Lake City fires, State fire marshals testified that additional nursing home fires had occurred within a few days of the tragedies. Ohio Fire Marshal Samuel Sides told the Subcommittee of a fire in Milford, Ohio (21 days after the Marietta fire), where a nursing home sprinkler system put out a fire, caused by a defective television set, without loss of life or major property damage. In a similar statement, Utah Fire Marshal Tanner reported a fire in a Salt Lake County nursing home days after the Lil-Haven Nursing Home fire. Sprinklers contained the fire, with only \$250 worth of damage.

Many recognized national organizations with expertise in this field have endorsed the concept of fully automatic sprinkler systems for nursing homes. Endorsements have come from: (1) The National Safety Council; (2) the National Fire Protection Association; (3) the Fire Marshals of North America; (4) the Joint Commission on the Accreditation of Hospitals; and (5) American College of Nursing Home Administrators.

The National Commission on Fire Prevention and Control recommended automatic sprinkler protection not only for nursing homes but for all types of units designed for the elderly. In testimony before the Senate Subcommittee on Housing for the Elderly, Commission Chairman Richard E. Bland stated: "I submit to this Subcommittee . . . that the requirement of complete automatic sprinkler systems is the available technical solution toward control of fire in housing for the elderly. I make no distinction between the types of care or housing unit."

HOUSE COMMITTEE ON GOVERNMENT OPERATIONS

The Special Studies Subcommittee, House Committee on Government Operations, published a report on December 18, 1974, entitled "Fire Safety Deficiencies in Nursing Homes." The subcommittee, beginning with the 92nd Congress, 1971, had been engaged in a continuing study of the problems of the aging. As part of that study, it had examined the area of fire safety in nursing homes. A series of hearings in 1971 and 1972 resulted in the 1972 report of the Committee on Government Operations, "Saving Lives in Nursing Home Fires."

The committee's 1972 report on fire safety in nursing homes, based on the subcommittee's hearings in the 92nd Congress, recommended that all nursing homes be required to have automatic sprinkler systems regardless of the type of construction.

Additional hearings were held in October 1973, June 1974, and August 1974. The results of those hearings were analyzed and published in the committee's 1974 report. The report concluded that the requirements of the Life Safety Code have not been effectively enforced.

The committee's 1974 report reiterated its earlier recommendation that all nursing homes, regardless of the type of construction, be equipped with automatic sprinklers.

The Committee's conclusion that there has not been enough improvement in life safety enforcement since Congress mandated it almost five years ago is based on a number of reviews and surveys. These were conducted at different times and by different organizations, but every one of these examinations revealed an unacceptably large number of life safety deficiencies.

Conclusions reported by the House Committee on Government Operations included:

The combination of a sparse night staff and of aged residents, 50 percent of whom are disoriented and 40 percent are partially or totally nonambulatory,

renders infeasible the successful evacuation of residents in case a fire occurs at night.

* * * * *

The use of a fire detection alarm system connected to the nearest fire department may serve to avoid a total loss of life, but it still does not prevent, as recent fires have shown, a substantial number of deaths occurring, notwithstanding an extremely prompt response by the alerted fire department.

* * * * *

Even fire resistive or protected noncombustible construction does not prevent fires of contents in such structures. In fact, if such construction is not carefully executed or if, at the time of a fire, doors are not closed, then such construction will not stop a fire from spreading, as demonstrated by the nursing home fires in Marietta, Ohio, in 1970, and in Buechel, Kentucky, in 1971.

The committee holds that the best means of avoiding multiple death fires is the construction of complete automatic sprinkler systems which will also transmit an alarm to the nearest fire service.

The committee made the following recommendation :

The appropriate congressional Committees should consider legislation requiring that, as a condition for eligibility under Medicare or Medicaid or to house the aged receiving old age assistance payments, each institutional facility for the aged, no matter what its name and even if not licensed under State law as a nursing home or related health care facility of some type, must have a complete automatic sprinkler system, which will also transmit an alarm to the nearest fire service.

AMERICAN HEALTH CARE ASSOCIATION

Testimony presented for the record at the June 3, 1976, hearing, by the American Health Care Association (formerly the American Nursing Home Association) includes the following comments :

Literal adherence to the Life Safety Code in existing buildings is rarely possible ; hence the statutory provision for the granting of waivers. The waiver system has been fraught with unbelievable confusion and error, resulting alternatively in non-enforcement of vital code requirements, or the unnecessary expenditure of thousands of dollars and disruption of patient care in nursing homes due to erroneous application of requirements.

* * * * *

AHCA has long supported sprinkler protection in nursing homes as the most effective single means of preventing multiple death fires. Dr. Thomas G. Bell, Executive Vice-President of AHCA, made extensive reference to the value of sprinklers in testimony before the National Commission on Fire Prevention and Control in Los Angeles, California, in June 1972. The Association continues to support sprinklers as an effective means of protection.

* * * * *

It is essential that greatly increased fire safety features do not impinge on the well-being of nursing home residents. The impact on existing nursing homes can be lessened by concentrating on automatic sprinklers, the one fire safety measure which years of experience have shown to be effective in controlling a fire while it is still small.

* * * * *

All the other fire safety measures now considered to be the primary line of defense by today's codes should take a back seat to sprinkler protection. All the other Code requirements now forced on nursing homes, have been proven to be less effective than sprinklers.

NATIONAL SAFETY COUNCIL

According to the National Safety Council and the American Nursing Home Association :

* * * automatic sprinkler systems installed throughout a facility, and not only in hazardous areas, provide the greatest "safety to life" factor available in the fire protection field, because they can automatically sound an alarm and immediately start fighting the fire when activated. When activated they are the most reliable and effective means of fire extinguishment. Other forms of protective equipment, including automatic alarms, are not effective substitutes for automatic sprinkler systems.

This quotation is from the "Safety Manual for Nursing Homes and Homes for the Aged," published by the National Safety Council in cooperation with the American Nursing Home Association (1962). The manual continues that "an automatic alarm system is not a substitute for an automatic sprinkler system."

ROANOKE COUNTY FIRE COORDINATOR

A multiple death fire occurred at the Shenandoah Nursing Home in Roanoke, Va., on June 17, 1976. Although this nursing facility was not participating in Medicare or Medicaid, it is significant that it did not have automatic sprinkler protection and that four people were killed and 28 injured in the fire. The Roanoke County fire coordinator said the facility was protected with smoke detectors which are less effective than automatic sprinklers. In his opinion, if the facility had been sprinklered, *there would probably have been not more than one fatality.*

CHIEF OF THE CHICAGO FIRE PREVENTION BUREAU

Mr. Francis J. Murphy, Chief of the Chicago Fire Prevention Bureau, presented testimony before the Subcommittee on Retirement Income and Employment of the House Select Committee on Aging on August 12, 1976. The Chief testified from his onsite experience at the Wincrest fire. He emphasized that because of the high degree of debility of the residents, special protection is needed :

What this means is that you are talking about one on one when it comes to care of this type of person. This means that you have to give all the protection, and the best protection now—not when the fire department comes—but now.

I have heard a lot of controversy over wouldn't a smoke detector, or wouldn't a heat detector be just as good as a sprinkler head over the bed? Or wouldn't sprinkler heads be better in the hallway and a smoke detector in the room?

Gentlemen, you are playing with Tinker Toys. This is not right.

You have got to put it (a sprinkler) where the fire is going to happen. And what does a sprinkler head mean? A sprinkler head, to me—and I have had 44 years in the Chicago Fire Department, from the bottom to the top—what does it mean? It means that you are standing there with a fireman, a 100 percent trained fireman, with a two-and-a-half-inch line with a nozzle full of water. All he has to do is turn it on; and he is there 24 hours a day, 365 days a year.

After the recent fires, a program was enacted in Chicago for sprinklers—100 percent in these types of homes—with smoke detectors. I do not think you could ask for anything better.

CONCLUSION

Based on its analysis of all relevant reports, tests, and studies, the subcommittee believes that automatic sprinkler systems offer the most realistic and practical solution to the problem of multiple death fires in nursing homes.

Fire resistive construction does not insure life safety. Smoke detectors do not put out fires. Nursing home staffs direct their attentions toward extinguishing fires and not toward removing patients from danger, and find that they have underestimated the level of impact, the speed of development, and lethality to the patients of the fire situation.

The subcommittee believes that automatic sprinkler protection, by its capability of reducing the basic fire threat, offers the major potential for the certification of buildings with deficiencies in Life Safety Code requirements.

The subcommittee recommends that legislation be enacted which requires all nursing homes participating in Medicare or Medicaid to be fully protected with an automatic sprinkler system. The subcommittee further recommends that no waiver of this requirement should be made, except in rare cases, and only when the nursing facility demonstrates that the waiver will not result in an adverse effect on patient safety and only in cases where application of this requirement would result in an unreasonable hardship upon the nursing home.

CHAPTER 3

THE COST OF AUTOMATIC SPRINKLERS

Gentlemen, you know, your mother, my mother, your father, can we put a price on their body? There is no money in this world that can put a price on their body.

So I say let us go the full route. And the best thing that I know of is a sprinkler system which is 98 percent perfect. So why fool around and why not go for the best?

—Mr. FRANCIS J. MURPHY, *Chief, Chicago Fire Prevention Bureau, Testimony before House Select Committee on Aging, August 12, 1976 concerning the Chicago nursing home fires killing 32 elderly persons and injuring 50.*

The value of a human life simply cannot be measured in terms of dollars and cents. Whether it costs a single dollar or millions of dollars to prevent elderly residents of nursing homes from being killed in senseless fires is totally irrelevant. We cannot, and will not attempt to prepare a cost benefit analysis which will compare the cost of an automatic sprinkler system to the benefit of saving human lives.

The subcommittee believes that our nation's elderly are an irreplaceable resource; and every reasonable measure should be taken to protect their lives. The subcommittee is determined to eliminate multiple death fires in nursing homes. Automatic sprinklers are the solution to this problem. The only remaining problem is the identification of the cost of this solution and the determination of how this solution will be financed.

The cost of automatic sprinklers should not be determined in a vacuum. The total cost must consider savings on additional fire safety construction renovations which may be unnecessary; consideration must be given to the long term reimbursement under Medicare and Medicaid; and consideration must be given to possible savings on fire insurance premiums of the building and its contents. And there are other considerations, including installations in existing and new construction, and whether pipes are to be concealed or exposed.

HOW MANY NURSING HOMES WILL BE AFFECTED?

Legislation to require automatic sprinklers in all nursing homes participating in Medicare or Medicaid will not be an insurmountable requirement. About half of our nation's 16,500 federally funded nursing facilities are already required to be fully protected with automatic sprinkler systems. Under the 1967 Life Safety Code, all nursing homes must have sprinkler systems except those which are of fire resistive or 1-story protected, noncombustible construction. HEW estimates that about 8,250 nursing homes, with an average capacity of 80 beds each, would be affected by legislation requiring automatic sprinkler protection in all nursing homes.

ACTUAL COSTS REPORTED BY THE GAO

The following analysis of actual sprinkler installation costs was included in the GAO report, "Federal Fire Safety Requirements Do Not Insure Life Safety in Nursing Home Fires," June 3, 1976.

The cost of installing an automatic sprinkler system will vary with the size and type of facility and depend on whether it is of new or existing construction. However, to examine the impact of requiring all nursing homes to install sprinkler systems, we are presenting general data obtained regarding the cost of sprinklers. In February 1976 we discussed the cost of installing a complete sprinkler system with a representative of the National Automatic Sprinkler and Fire Control Association. According to the representative, the installation of a complete sprinkler system, including pumps, valves, piping, and alarms, would cost from 75 cents to \$1.25 a square foot while constructing a building. Installation in an existing building would cost from \$1 to \$1.50 a square foot. Variables include whether the pipes were to be concealed or exposed, whether the sprinkler heads were to be recessed, and the availability of a water supply (that is, is a reservoir necessary), etc. In April 1976 we obtained data from seven sprinkler installation companies in the Washington-Baltimore area. According to their estimates, a sprinkler system might cost between 50 cents and \$1.75 a square foot in an existing facility. Actual installations during 1975 in four existing nursing facilities, three in Ohio, and one in Minnesota, showed costs ranging from \$393 to \$625 a bed, as follows:

	Number of beds	Square feet	Total HEW approved cost of sprinkler system	Cost per bed	Cost per square foot
Facility:					
1-----	30	12,100	\$18,744	\$625	\$1.55
2-----	34	16,481	20,070	590	1.22
3-----	100	35,484	42,850	429	1.21
4-----	150	48,040	58,917	393	1.23

SPRINKLER SYSTEMS MAY COST ABOUT \$5.57 A BED EACH MONTH

Using the highest actual cost per bed, the monthly cost of amortizing \$625 a bed over a 20-year period with a 9¼ percent interest rate is \$5.57 a bed each month, or about 19 cents a bed each day.

According to the National Fire Protection Association, automatic sprinkler heads need replacement at the end of 50 years. However, financing sprinkler system installation over a period of more than 20 years does not seem likely. Consequently, our computation shows the monthly payment expected over the term of a 20-year loan.

Obviously, costs per bed tend to decrease as the number of beds increases. This is because certain larger costs, such as check valves, water main connections, and alarm hook-ups are necessary for each installation regardless of bed size. Consequently, when these larger costs are spread out over more beds, the total cost per bed is reduced.

WHAT IS A SPRINKLER SYSTEM?

According to the National Fire Protection Association, a sprinkler system for fire protection purposes, is an integrated system of underground and overhead piping designed in accordance with fire protection engineering standards. The installation includes a water supply, such as a gravity tank, fire pumps, reservoir or pressure tank and/or connection by underground piping to a city main. The portion of the sprinkler system above ground is a network of specially sized or hydraulically designed piping installed in a building, structure, or area,

generally overhead, and to which sprinklers are connected in a systematic pattern. The system includes a controlling valve and a device for actuating an alarm when the system is in operation. The system is usually activated by heat from a fire and discharges water over the fire area.

Hospitals, nursing or convalescent homes are classified as light hazard occupancies. This classification identifies the appropriate standards for occupancies or portions of other occupancies where the quantity and/or combustibility of contents is low and fires with relatively low rates of heat release are expected.

Standards have been established by NFPA for sprinkler systems in nursing facilities and include the following:

The maximum floor area to be protected by one system on any one floor shall be 52,000 square feet;

Branch lines shall generally not exceed eight sprinklers on either side of a cross main;

Piping may be of either steel or copper construction, with minimum diameters dependent on the number of sprinklers;

Each system shall be provided with an approved valve, supervised by an alarm, to control all sources of water supply;

Ordinary sprinklers must meet temperature ratings of from 135 degrees F to 170 degrees F;

The distance between branch lines and between sprinklers on the branch lines shall not exceed 15 feet; and

The protection area per sprinkler shall not exceed 200 square feet.

SPRINKLER COST PER SQUARE FOOT

According to HEW regulations (45 CFR 249.12(b)), "resident bedrooms shall have no more than 4 beds. Single resident rooms measure at least 100 square feet, and multi-resident rooms provide a minimum of 80 square feet per bed."

In reviewing the NFPA standards, it appears that a per bed cost analysis of sprinkler installations may overstate total costs. This is the case because it may not be necessary to have one sprinkler per bed. The capacity of sprinkler protection is 200 square feet per sprinkler, which area could easily accommodate two beds. Consequently, in bedrooms containing four beds, a total of two sprinklers may be sufficient protection.

In order to evaluate total costs in a realistic light, it appears square footage estimates will result in more accurate projections because this is the basis for cost estimates by sprinkler installation companies.

From the table prepared by GAO on actual installation costs, there does not seem to be the same relationship of cost per square foot as there was with cost per bed. Significantly, the facility with the lowest cost per bed did not realize the lowest cost per square foot.

The average costs per square foot were shown, by GAO, to range from \$1.21 to \$1.55. The GAO also reported estimates from sprinkler installation companies of costs per square foot ranging from 50 cents to \$1.75 for an existing building. The analysis here will restrict itself to existing buildings since these are the facilities most affected by a change in legislation to require sprinklers. In addition, installation cost in new construction is known to be less expensive. Consequently,

for analysis purposes, a high estimate of \$1.75 per square foot and a low estimate of \$1.21 per square foot will be considered. The estimate of 50 cents per square foot will not be used in order to be as realistic as possible.

COST PROJECTIONS ON A SQUARE-FOOT BASIS

According to HEW figures, about 8,250 nursing homes, with an average of 80 beds each, will require automatic sprinklers if such legislation is enacted. Considering these figures, the following analysis results:

1. Eighty beds per facility multiplied by 80 square feet per bed results in about 6,400 square feet of bedroom area per facility, on the average.

2. Assuming that each facility will have an area equivalent to three times the sleeping area for resident activities, as well as corridors, storage areas, and administrative areas, an additional 19,200 square feet per facility should be considered for sprinkler protection.

3. The total estimated area, per average facility, requiring sprinkler protection is thus, about 25,600 square feet. This total appears consistent with the actual square footages reported by the GAO sample of actual installations.

4. The high and low range cost estimates, per facility, can be estimated from \$30,976 at \$1.21 per square foot to about \$42,800 at \$1.75 per square foot. These totals appear consistent with actual costs reported by the GAO sample of actual installations.

5. Considering that 8,250 facilities will need sprinkler protection, it can be projected that the total expenditure may approximate from \$256 million to \$353 million on a national basis.

HEW AND NATIONAL BUREAU OF STANDARDS COST ESTIMATES

At hearings on June 3, 1976, HEW estimated that the total cost of installing sprinklers in all nursing homes participating in Medicare and Medicaid would be about \$412.5 million. This HEW estimate was based on multiplying 8,250 facilities by 80 beds per facility for a total of 660,000 beds multiplied by \$625 per bed (the highest cost per bed reported by GAO) to equal \$412.5 million.

The fallacy of this analysis is that HEW used the number of beds as the basis of their projections. This, as was shown previously, can result in an overstatement of total costs.

HEW also testified that their best estimate of the cost per square foot for sprinkler installations was about \$2.30. This, HEW pointed out, would result in a per bed cost of \$927 and a total cost of \$611.8 million.

The HEW computation obviously is based on the assumption that each bed represents a total of 403 square feet of area in need of sprinkler protection. This would include the 80 square foot minimum per bed plus four times this area for community and administrative areas.

The fallacy here is that both the costs per square foot, and total areas are overstated. The highest estimate obtained by GAO is \$1.75 per square foot and the highest actual cost for installation, as shown by the GAO table is \$1.55 per square foot. HEW has supplied no basis for

its cost estimate of \$2.30 per square foot. In addition, the 403 square foot area per bed appears too high when compared to the four actual cases cited by GAO. In a 100 bed facility the actual square footage area was shown as 35,484, while HEW would estimate a facility of this size to have 40,300 square feet for their cost projection purposes. The mathematical average of the GAO sample shows that an average total area per bed approximates 357 square feet. Using the highest cost estimate reported by the GAO, \$1.75 per square foot, this projection (357 square feet per bed multiplied by \$1.75 per square foot, multiplied by 660,000 beds), results in a total national cost of \$412.3 million.

The HEW estimate of \$2.30 per square foot with 403 square feet per bed results in a total national cost of \$611.8 million, which reflects a total variance of \$199.5 million. The high cost estimate of \$2.30 per square foot results in an overstatement of \$221.65 per bed, or about \$146.4 million of the total overstatement. The high area estimate results in an overstatement of \$80.50 per bed, or about \$53.1 million of the total overstatement. This HEW estimate simply overstates both cost and area and is not a sound basis upon which to project the total national cost of requiring nursing homes to install automatic sprinklers. Consequently, considering that the cost per square foot is \$1.75, and the square footage per bed is 357 rather than 320 (as previously estimated) then the highest estimate of cost would be \$624.75 per bed for a total of \$412.3 million on a national basis.

HEW further estimated that at 1978 prices, the cost of installing sprinkler systems will approximate \$3.00 per square foot.

The fallacy here is simply that HEW has presented no basis for suggesting that costs will increase to this degree. Subcommittee staff investigators found that sprinkler-installation companies believe that competition will keep costs down.

The National Bureau of Standards projects the cost of automatic sprinklers at \$625 million. This projection is based on a total of 1.3 million nursing facility beds available in the United States, of which only .3 million are already protected by automatic sprinklers. The remaining 1 million beds were multiplied by the highest GAO figure of \$625 per bed resulting in an estimate of \$625 million.

The fallacy of this estimate is obvious. The determination of cost for sprinkler installations should be based on square footage, not beds, as previously stated. Further, there is no logic in the Bureau of Standard's estimate of 1 million beds in unsprinklered facilities. HEW, the agency which administers both Medicare and Medicaid, has estimated that only about 660,000 beds are in facilities not protected by automatic sprinklers. HEW stated that about half of all nursing facilities are already required to have automatic sprinkler systems. Half of the 1.3 million beds would approximate the 660,000 beds HEW estimates are currently not protected by automatic sprinklers.

SUBCOMMITTEE OBSERVATION

From the cost data presented to the subcommittee, it is estimated that a national commitment for automatic sprinklers in all nursing homes would cost from \$256 million to \$412.3 million. The range results because each installation differs from the other; and consideration

of such factors as whether pipes are to be exposed have some cost implications which cannot be readily identified.

DIRECT FEDERAL LOANS ARE NECESSARY

The congressional commitment to assist nursing homes install automatic sprinklers through the federally insured loan program of 1973 has not resulted in the issuance of a single loan anywhere in the country. The GAO reported that the loan insurance program was simply not operational because of the governmental red tape nursing homes were subjected to, and the lack of incentives over commercial financing.

The Congress enacted Public Law 93-204, on December 28, 1973, which was intended to provide insurance to assist nursing homes install sprinkler systems. This law was enacted on the basis of the recommendation of the House Committee on Government Operations.

Bureaucratic tangling between HEW and HUD, which have joint authority over this program, together with a "Catch-22" situation of excessive processing time and a prohibition against loan insurance after work has begun, are largely responsible for the failure of the program.

The Subcommittee on Health and Long-Term Care, based on its analysis of the problems, concludes that a loan insurance program is not the answer. The congressional commitment for fire safe nursing homes must be followed through with direct loans, not grants or insurance, to insure the availability of funds.

Under the proposal to make funds available to nursing homes on a direct loan basis for the installation of sprinkler systems, three factors must be considered: inflation, interest, and present value.

The present value factor is the actual dollar cost to be paid currently for sprinkler installations. The dollars paid today are estimated from \$256 million to \$412.3 million. This will be the amount the Federal government will loan to nursing homes which will in turn be paid for the installation of sprinkler systems. These present values are unaffected by either inflation or interest. This will be the full amount loaned by the government.

Interest is a factor in considering the amount to be paid back to the government by the nursing homes. The interest rate under consideration is 6 percent. The subcommittee proposal would require nursing homes to *repay the loan over a 20 year period with interest not exceeding 6 percent annually*. This rate approximates the Federal government's cost of borrowing the funds, considering the interest paid by the government on Series E savings bonds. *This results in the government incurring no long-term dollar cost in loaning the money* to nursing homes because the government's cost of borrowing these funds has been returned. The nursing homes are receiving the benefit of being able to borrow the funds at an interest rate which is less than what would be charged by banks and other financial institutions.

Inflation is a factor which must be considered in the loss of dollar value over the repayment period. Although the present value of the dollars paid out are certain, the present value of the dollars paid back over 20 years is uncertain. This is the case because the rate of future inflation is an unknown. However, a factor for inflation must be included in the analysis. The Congressional Research Service of the

Library of Congress has determined the projection of the future inflation factor over the next 15 years for fixed investments for non-residential equipment at a rate of about 5.8 percent. This rate estimates the annual increases expected in the cost of this type of investment. The Library of Congress has identified the projected rate of overall inflation to be about 5.3 percent. This means that if this rate holds, the purchasing power of the dollars spent today will be reduced by 5.3 percent each year over the loan payback period. Very simply translated, the only cost to the Federal government that will result from the proposed loan program will be the dollar value lost as a result of inflation. Although there is no certain method of determining if this inflation rate will remain constant, it should be recognized that all Federal loan programs are subject to the same inflation factor. To protect against this inflation cost, the government would have to charge a higher interest rate which may not be in the public interest for this program.

MEDICARE AND MEDICAID REIMBURSEMENT

Nursing facilities participating in either Medicare or Medicaid will be reimbursed for part of the cost of automatic sprinkler systems through interest and depreciation.

Depreciation is the allocation of the cost of sprinkler systems over a period of time. For example, a \$40,000 system depreciated over 20 years will result in an annual charge to depreciation of \$2,000. Both Medicare and Medicaid reimburse for all allowable costs associated with the use of the facilities. Depreciation is an allowable cost and will, therefore, be reimbursed to the nursing home.

In the case of nursing homes with all Medicare or Medicaid residents, the sprinkler system will cost nothing to the owners since Medicare and Medicaid will reimburse the facility in full. Interest is also included as an allowable cost and will be reimbursed by the Medicare and Medicaid programs.

In the case of nursing homes with all Medicare or Medicaid residents, each month they will receive full reimbursement for their monthly payments for the sprinkler system loan, including interest. In facilities with some private paying residents, Medicare and Medicaid will only pay their proportionate shares of the nursing home costs.

SAVINGS ON UNNEEDED CONSTRUCTION MODIFICATIONS

Many nursing homes were built long before the 1967 Life Safety Code was published. Many facilities were originally built as apartments, private houses, hotels, and other buildings.

While these buildings met the building and fire codes of the 1930's, 1940's and 1950's, they may not meet the 1967 Life Safety Code. Consequently, in order for these nursing homes to meet the requirements for Medicare and Medicaid certification, major construction renovations may be required. For example, the Life Safety Code requires that "no existing building shall be converted to a hospital, nursing home, or residential-custodial care institution unless it complies with

all requirements for new institutional buildings." Some of the Life Safety Code requirements for building construction include:

Corridors shall be separated from use areas by partitions having a fire resistive rating of at least one hour;

Interior finish of walls and ceilings of any room shall be Class A;

Institutional occupancies two or more stories in height shall have enclosure walls of noncombustible materials having a fire resistance rating of at least two hours around stairways, elevators, chutes, and other vertical openings between floors;

Any smoke partition shall have a fire resistance rating of at least 1 hour.

In many cases, facilities built years ago were not constructed to meet the above standards. However, all facilities must meet the construction standards of the Life Safety Code for Medicare and Medicaid certification.

Thousands of dollars may be spent by nursing home owners in order to make construction modifications in order to meet the Life Safety Code standards. These many thousands of dollars may be totally unnecessary if the facility is protected with a sprinkler system. Both the Wincrest and Cermak nursing homes fully met the construction standards of the Life Safety Code, and still 32 people were killed because of fire.

Gage-Babcock and Associates, Inc., a fire protection engineering firm, reported on both the Wincrest and Cermak fires that fire resistive construction did not contain the fire any better than protected wood frame construction would have. Based on actual fire tests, the engineering firm reported that with automatic sprinklers, the fire does not last long enough to be affected even by combustible wall paneling and ceiling tiles.

At the June 3, 1976, hearing, representatives from the General Accounting Office testified that, in the cases of the Wincrest and Cermak fires, time was the critical factor. Within minutes of the fires, a lethal environment was created. It was not a matter of withholding the fire for a period of hours, but rather the danger was measured in terms of seconds and minutes.

A witness to the fire at Wincrest, the Reverend William Pollard, exemplified the speed with which the fire took place. He said at the subcommittee hearing that "very, very quickly the white smoke turned to black smoke and it began to descend on us until we could no longer see the fire, until we could no longer breathe."

The subcommittee believes that with automatic sprinklers, the safety of patients would not seriously be compromised by "trading-off" the strict enforcement of the various hour ratings of building construction for automatic sprinkler installation. Consideration should be given, for existing facilities, to not requiring major construction renovations when the facility is fully protected with an automatic sprinkler system.

HEW has authority, under existing law, to waive any Life Safety Code standard if enforcement of such standard would result in an unreasonable hardship on the facility, but only if such waiver will not adversely affect the safety of the patients. The subcommittee believes that with an automatic sprinkler system there will not be an adverse effect on patient safety if certain construction standards are waived. HEW should give serious consideration to granting certain

construction standards waivers in facilities where complete automatic sprinkler protection is provided.

The subcommittee believes that facilities can save many thousands of dollars in unnecessary construction renovations and upgrade their level of fire protection by installing automatic sprinkler systems.

POSSIBLE SAVINGS ON FIRE INSURANCE

As pointed out in the GAO report, savings are possible on fire insurance premiums on both the building and its contents when automatic sprinklers are installed. The GAO reported:

Although fire insurance rates vary among States, savings are possible on both building coverage and contents insurance when nursing facilities are protected by automatic sprinkler systems. We obtained information on the general rates in Maryland and Washington, D.C., and found that savings of about 30 percent are possible on building coverage and 50 percent on contents insurance.

According to a representative of the Insurance Services Offices of Maryland, a rating bureau under the jurisdiction of the State Insurance Commission, fire insurance premiums would be less because of the installation of automatic sprinklers in nursing facilities. With regard to fire insurance on the building, he said the rate per \$100 of insurance is about 8 cents without sprinklers in ordinary construction and about 6 cents with sprinklers, for a reduction of about 25 percent. In protected wood frame construction, he said the fire insurance rate per \$100 of insurance is about 16 cents without sprinklers and about 11 cents with sprinklers, for a savings of about 30 percent.

According to a representative of the Insurance Rating Bureau of Washington, D.C., building contents insurance premiums could be reduced by as much as 50 percent by installing automatic sprinkler systems. He quoted rates for nursing facilities of frame, ordinary, and fire resistive construction. He stated that in buildings of frame construction, the building contents insurance rate per \$100 of insurance is about 71 cents without sprinklers and 45 cents with sprinklers, for a reduction of about 37 percent. In ordinary construction, he said the building contents rate per \$100 of insurance is about 50 cents without sprinklers in contrast to about 30 cents with sprinklers, for a savings of about 40 percent. For fire resistive construction, he quoted a building contents insurance rate per \$100 of insurance of about 20 cents without sprinklers and 10 cents with sprinklers, for a reduction of about 50 percent.

To illustrate the annual savings on fire insurance premiums due to the installation of an automatic sprinkler system, consider a hypothetical example of a protected wood frame facility insured for \$500,000 on the building and \$100,000 on the contents. Without a sprinkler system the facility would pay about \$800 for building insurance at 16 cents per \$100 of coverage and about \$710 for contents insurance at 71 cents per \$100 of coverage, for a total annual cost of about \$1,510. With a sprinkler system the facility would pay about \$550 for building insurance at 11 cents per \$100 of coverage and about \$450 for contents insurance at 45 cents per \$100 of coverage, for a total annual cost of about \$1,000. In this hypothetical example, the installation of an automatic sprinkler system would result in annual savings for fire insurance in excess of \$500.

NEW CONSTRUCTION

The subcommittee believes that no new nursing facility should be built without automatic sprinkler protection. The cost of sprinkler installation in new construction ranges from 75 cents to \$1.25 per square foot according to GAO. Because of the benefits of automatic sprinklers over various other construction standards, every future nursing home should be fully protected with an automatic sprinkler system. The possibility of waiving certain construction standards in order to "trade-off" costs should be given serious consideration by HEW and the States in enforcing provisions of the Life Safety Code in new construction.

ARGUMENTS CONCERNING THE PRIORITY OF THE HEALTH DOLLAR

At the June 3, 1976 hearing, HEW presented testimony which pointed out the many problems facing residents of nursing homes related to the quality of health care. Dr. Faye G. Abdellah, Special Assistant to the Undersecretary for long-term care, stated that:

In terms of the needs of individuals in facilities are the basic requirements of health and nutrition, for example the need for occupational therapy, and other things we want elderly individuals to receive in long-term care facilities. Their needs must be weighed against the overall need for sprinklers. The investment for sprinklers needs to be weighed in terms of the total needs of the individuals in these facilities and arriving at a balance of both safety and health requirements.

The subcommittee agrees wholeheartedly with Dr. Abdellah. However, we fail to see the conflict of goals. Currently, over \$9 billion annually is spent for care in nursing homes. Federal standards for health care have been established and the Federal Government is paying 100 percent of the salaries of inspectors to insure that the nursing homes are providing care in accordance with the standards.

Both Medicare and Medicaid are paying nursing homes on a cost-related basis. In other words, they are reimbursed for the cost of providing health care.

The subcommittee believes that if nursing home residents are not receiving proper care, even though the cost is over \$9 billion annually for this care, then either the HEW standards for proper care are inadequate or the enforcement of the standards is inadequate. We are aware of serious deficiencies in the enforcement of Federal standards by State inspectors and this subcommittee plans to continue its oversight responsibilities in this area.

The subcommittee fails to see the logic of any argument which states that the investment for automatic sprinklers should be deferred or eliminated because these funds would take away from other health care funds. The total fiscal 1977 appropriation for the Department of HEW exceeds \$45 billion. A very large sum of money is continually being spent on health care by the Federal Government each and every year, and the cost of automatic sprinklers is a one-time loan spread out over a 20-year period, with no direct long-term cost to the Federal Government. The subcommittee does not agree that the investment in automatic sprinkler systems is going to reduce the amount of Federal money spent on health care.

The subcommittee believes the cost to facilities (19 cents per patient per day over 20 years) is low enough to be extremely feasible economically and is badly needed.

The subcommittee believes that a safe environment is of critical importance in providing adequate health care. As was pointed out at the June 3, 1976 hearing, fire safety is one of the single most important psychological factors leading to the emotional well-being of an elderly person in a nursing home. Nursing home residents in facilities visited by subcommittee staff related "fear of a fire" as one of their greatest concerns, as virtually all residents had seen television or newspaper accounts of the many recent tragic fires.

CHAPTER 4

OTHER APPROACHES TO FIRE SAFETY

Research at the National Bureau of Standards has been in progress as a result of recommendations made in the December, 1972 GAO report, "Study of Health Facilities Construction Costs." This research has led to the identification of other protection systems which some researchers believe could provide an equal level of life safety as full sprinkler protection in health care facilities. Two of these potential systems are:

1. Smoke detection capability in each patient room combined with a limited automatic sprinkler system: an automatic sprinkler head placed in the corridor opposite each patient room door.
2. An automatic door closer mechanism combined with a detection unit for each patient room.

These items represent two potential systems that have been identified in the preliminary work done at the National Bureau of Standards. It is estimated, by the researchers, that a typical fire growth and development scenario within a patient room provides a five minute period of time for action from the time of open flaming to room flash-over; and that smoke detectors in the patient room would respond to a fire in less than two minutes into its growth. This would allow staff over three minutes to rescue patients within the room of origin, and to take initial actions that might mitigate the full growth and development of the fire within the room. Thus, the detection systems in both of the proposed alternative fire protection approaches could provide a higher level of potential life safety for patients within the room of origin.

In addition, according to the Bureau of Standards researchers, the automatic sprinkler protection provided in the corridor, with heads located opposite each patient room door, would provide an energy balance mechanism which could prevent fire from the room of origin entering into the corridor and into the remainder of the facility.

THE SMOKE DETECTOR ALTERNATIVE

Although this alternative has merit in the early detection of a fire, the three minutes deemed to be available for evacuation of residents and fire prevention actions may not be sufficient to insure life safety. Too much reliance on human action is required. As was pointed out at both the Wincrest and Cermak fires, no deaths occurred in the rooms of origin; and the environments became deadly in a few short minutes. There was no indication, at these fires, that any delay in the identification of the fires contributed to the loss of life.

Another fallacy of this alternative is the reliance on a sprinkler system outside the room of origin to prevent the spread of fire. Current

standards require that patient rooms be separated from the corridor by 1-hour fire resistive construction. This would require that if the door is closed, the fire must become so intense that sufficient heat was generated through the wall to activate the sprinkler in the corridor. This would mean that an equal or perhaps greater degree of heat would be generated toward patient rooms on either side of the fire room and to the floor above. Consequently, before the sprinkler in the corridor would be activated, the fire may have spread to adjacent patient rooms, also without sprinkler protection. This alternative still relies on human action to put out the fire.

Another fallacy of this alternative is that by the time the sprinkler system in the corridor was activated, the room of fire origin would probably be burning out of control. Even activation of the sprinkler would not extinguish the fire in the room of origin nor prevent its spread to adjacent rooms through walls, floor, or exterior windows. The sprinkler would only prevent the fire from spreading through the door and would have little, if any, effect on extinguishing the flames. The corridor sprinkler may have little effect on smoke propagation.

Another fallacy of this alternative is cost. The larger costs of installing a sprinkler system relate to check valves, connections to water main, and alarm hookups. Very little cost savings will result from not extending branch piping into patient rooms from the cross main pipe. Even this alternative relies on the installation of an automatic sprinkler system, which includes the larger cost items and labor expense. In addition, according to the Congressional Research Service of the Library of Congress, smoke detectors are relatively expensive. The Library reported that equipment and installation costs, including costs for fire alarm equipment, stations, gongs, and smoke detector units would be as follows:

1-story, 25 bed facility-----	\$10, 000
2-story, 50 bed facility-----	20, 000
Multistory, 100 bed facility-----	50, 000

These figures indicate that smoke detectors could cost from \$400 to \$500 per bed.

THE AUTOMATIC DOOR CLOSER ALTERNATIVE

The other proposed alternative solution of the Bureau of Standards researchers would provide no direct extinguishment mechanism for the fire. Closing the door has been shown to be effective in fire containment and in preventing the spread of smoke and gas. The automatic door closer system, which provides a smoke detection device to automatically close the door and sound an alarm, provides one additional feature: a higher level of redundancy against human action taken during the fire. The Bureau's investigation of the two Chicago nursing home disasters determined that doors on patient rooms involved in fire were closed by the staff early in the fire but were then repeatedly reopened by staff action in attempting to extinguish the fire. The doors were finally left open due to the heat and smoke conditions within the room of origin, which made manual operation of the doors impossible. The automatic door closer mechanism could, with a degree of reliability significantly

greater than dependence on human action, still be capable of closing a door late in a fire even after human action had taken place leading to the reopening of the door. The Bureau of Standards estimates the cost of door closers to be between \$400 and \$500 per door in an existing building: more if the devices on all doors are interconnected so as to either sound an alarm or so that all doors will operate if one detects smoke.

The primary problems of the automatic door closer alternative are that it is costly and does nothing to extinguish the fire. Further, there is no reliable data on either the long term reliability or maintenance problems associated with these somewhat complex door closers. They represent a new technology and in all probability there will be some problems. This type of device has been on the market in modest numbers for 5 to 10 years and the limited experience has been quite variable. At this time, according to the Bureau of Standards, there is no data regarding the capability of the door closer on the room of fire origin if the door should be opened during the fire sequence in attempts to rescue or fight the fire. Warping the door or bending of the hinges, however, would be expected to be a significant factor on reclosing the door.

An option to smoke operated door closers is self-closing doors. Self-closing doors may, for all intents and purposes, be impractical in any facility where doors close as soon as the person passing through lets loose of the door or its handle. The use of these doors by wheelchair patients may be all but impossible.

Another fallacy of this alternative is that there may be some reduction in the safety of immobile occupants in the room of origin due to the potential interference with rescue operations should the door automatically close before the patients are removed. This may also result in a problem for people in wheelchairs and semiambulatory people. Automatic door closers generally work on an electro-magnetic principle. However, wheelchair patients can easily bump into the doors causing them to close and possibly causing injury. In addition, furniture, meal tray carts, or wheelchairs could be placed in front of the doors rendering the closing device useless in case of fire. In addition, elderly patients could be injured, in case of fire, if they are hit by a closing door. This alternative still relies on human action to put out the fire.

SUBCOMMITTEE OBSERVATION

The alternatives to complete automatic sprinkler protection proposed by the National Bureau of Standards do not provide for the extinguishment of fires or serve to prevent multiple death fires in nursing homes. The first alternative requires substantial expenditures and uses the benefits of automatic sprinkler protection improperly by not placing the sprinklers over the fire. Although a combination smoke detector system in conjunction with complete automatic sprinkler protection would provide the highest level of safety, the cost of this combination would be unreasonable. The subcommittee holds that prompt extinguishment of a fire is the solution to preventing multiple deaths. Complete automatic sprinkler protection is the most cost effective method of eliminating multiple death fires in nursing homes.

CHAPTER 5

WAIVERS FROM FIRE SAFETY REQUIREMENTS

The Social Security Act allows HEW to waive specific provisions of the Life Safety Code which if rigidly applied would result in unreasonable hardship upon a nursing home, but only if such waiver will not adversely affect the health and safety of the patients.

The subcommittee believes that in cases where automatic sprinkler protection is provided throughout a facility, waivers from certain construction requirements of the Life Safety Code would not result in an adverse affect on patient health and safety. Consequently, one of the prerequisites HEW should require, before waivers from Life Safety Code provisions are granted, is complete automatic sprinkler protection throughout the facility.

SPRINKLER REQUIREMENT WAIVERS

A requirement that all nursing homes, regardless of construction, be fully protected with an automatic sprinkler system, may, in certain cases, present an unreasonable hardship on a nursing facility. For example, nursing homes of 15 beds or less, may find that if they are forced to install sprinkler systems, the financial burden would bankrupt the facility. The subcommittee wants to protect lives from multiple death fires, and not force the closure of nursing facilities. Consequently, HEW should consider waivers from the sprinkler requirement, in those cases where an unreasonable hardship would be placed on a nursing facility, but only if such waiver will not adversely affect patient health and safety.

In its March 18, 1975 report, entitled, "Many Medicare and Medicaid Nursing Homes Do Not Meet Federal Fire Safety Requirements," the General Accounting Office reported that HEW was not properly enforcing the waiver provision in cases of waivers from the automatic sprinkler requirement. The GAO reported that in 79 percent of the cases, waivers were granted from the sprinkler requirement even though the facilities did not meet the requirements for such waiver. The GAO recommended that HEW establish requirements to be met by a nursing home, before the waiver is issued, in order to assure that the waiver would not adversely affect the health and safety of the patients.

The GAO recommended in its June 3, 1976 report, entitled, "Federal Fire Safety Requirements Do Not Insure Life Safety In Nursing Home Fires," that "because of HEW's improper treatment of its existing waiver authority, and its lack of acceptance of the need for waiver standards for all types of construction, the Congress should require that HEW establish waiver standards which must be rigidly enforced

before a waiver may be granted to any facility, regardless of construction type."

The subcommittee agrees with the GAO recommendation. It is too important to protect the lives of nursing home residents from the dangers of fire to allow lax enforcement of fire safety standards. The subcommittee offers the following suggestions to HEW as the minimum requirements which must be met by any facility, regardless of construction, before a waiver from the automatic sprinkler requirement should be issued:

Among the requirements which HEW should take into account:

1. Smoke detectors must be located in all patient rooms and throughout the facility and connected to an alarm which will notify the nursing home staff and the local fire department.

2. Smoke barriers and automatic closing smoke doors shall be installed in accordance with the Life Safety Code standards.

3. Patient rooms shall be separated from each other and all other areas by construction having at least a 1-hour fire resistance rating.

4. All other Life Safety Code requirements, including the automatic extinguishment requirement for hazardous areas, shall be met.

SUBCOMMITTEE OBSERVATION

The subcommittee recognizes that in some cases, a requirement to install an automatic sprinkler system could result in unreasonable hardships, and some facilities may be unable to comply with a requirement for automatic sprinklers. Since such factors may exist, the waiver provision of the Social Security Act should be applied only in specific cases and only when approved by personnel qualified in fire protection engineering. *HEW policy should be to make every effort to avoid waivers and assure installation of complete sprinkler protection in all nursing homes.*

CONCLUSIONS

On the basis of extensive research, a joint hearing with the Senate Subcommittee on Long-Term Care, and the investigation conducted by the General Accounting Office, the Subcommittee on Health and Long-Term Care makes the following conclusions:

1. In spite of previous congressional efforts to insure life safety in nursing homes, multiple death fires continue to occur.

2. Experts agree that automatic sprinkler systems are the most effective known method to eliminate the problem of multiple death fires in nursing homes.

3. The two nursing home fires in Chicago resulting in multiple deaths, and other fires elsewhere, demonstrate conclusively that fire resistive construction does not prevent multiple death fires.

4. Actual fire tests, contracted by the Department of Health, Education, and Welfare, have concluded that fire resistive construction provides no significant life safety benefit in buildings protected by automatic sprinklers.

5. Adequate time is not available to safely evacuate residents in cases of fire. Nursing homes must be made capable of protecting residents without relying on evacuation.

6. Prompt response time by local fire departments may prevent the total destruction of the building and reduce fire loss, but it cannot prevent multiple death fires in nursing homes.

7. In addition to confining and extinguishing the fire, automatic sprinklers will reduce and control the total amount of smoke and heat produced by a fire and thus contribute to preventing life loss.

8. The National Bureau of Standards has reported that full protection by automatic sprinkler systems is the best known way to prevent disastrous multiple death fires.

9. Self-closing doors are not a practical solution to preventing multiple death fires because they provide no direct extinguishment mechanism and because they may close and cause injury or present a problem to occupants of the room.

10. Smoke detectors only notify that there is a fire and provide no means of extinguishment nor control of fire and smoke.

11. There has never been a multiple death fire in a nursing home fully protected with an automatic sprinkler system.

12. Half of the nation's 16,500 Medicare and Medicaid nursing homes are not fully protected with automatic sprinkler systems.

13. Numerous nationally recognized organizations recommend full automatic sprinkler protection in all nursing homes.

14. The current Federal loan insurance program for fire safety equipment has been totally ineffective because of delays from bureaucratic tangling between HEW and HUD, and because of a requirement that loans cannot be approved after work has begun.

RECOMMENDATIONS

The Subcommittee on Health and Long-Term Care of the House Select Committee on Aging makes the following recommendations, based on the results of investigations by the subcommittee, years of study and research by numerous individuals and organizations, and conclusions and recommendations made by experts in the fire protection industry:

1. The Congress should immediately enact legislation which will require that all nursing facilities participating in Medicare or Medicaid be fully protected with automatic sprinkler systems. Such systems should meet the standards established by the National Fire Protection Association in its publication NFPA No. 13, "Standards for Sprinkler Systems."

2. The Congress should enact legislation providing a revolving fund by which the Department of Health, Education, and Welfare may make direct loans to nursing facilities for the purchase, construction, and installation of automatic sprinkler systems. Such loans should provide for interest at a rate not to exceed 6 percent.

3. The Congress should enact legislation requiring the Department of Health, Education, and Welfare to establish minimum requirements which must be met by any nursing facility before a waiver from the automatic sprinkler requirement is issued. These minimum requirements should reasonably assure that a waiver from the automatic sprinkler requirement would not adversely affect the health and safety of the patients; and that such waiver would only be issued when enforcement of the sprinkler requirement would result in an unreasonable hardship on a facility.

4. All States should take action to require complete automatic sprinkler protection in all group homes caring for the elderly, whether or not certified for Medicare or Medicaid. This requirement should extend to all forms of institutional elderly housing regardless of their institutional classification, whether skilled nursing facilities, intermediate care facilities, nursing homes, homes for the aged, or custodial facilities.

APPENDIXES

Appendix I: RELATED REPORTS ON FIRE SAFETY

1. Report of the Comptroller General of the United States, "Federal Fire Safety Requirements Do Not Insure Life Safety In Nursing Home Fires," June 3, 1976.
2. Report of the Comptroller General of the United States, "Many Medicare and Medicaid Nursing Homes Do Not Meet Federal Fire Safety Requirements," March 18, 1975.
3. Report of the House Committee on Government Operations, "Fire Safety Deficiencies In Nursing Homes," December 18, 1974. House Report 93-1627.
4. Report of the American Health Care Association, "Fire Test in a Nursing Home Patient Room," June 1975.
5. Report of the panel appointed by the Mayor of Chicago to investigate the Wincrest Nursing Home fire, May 1976.
6. Report of the National Fire Protection Association on its analysis of the Wincrest and Cermak Nursing Home fires, April 1976.
7. Report of the Senate Subcommittee on Long-Term Care, "The Continuing Chronicle of Nursing Home Fires," August 1975. Senate Report 94-00.
8. Report of the House Committee on Government Operations, "Saving Lives in Nursing Home Fires," August 9, 1972. House Report 92-1321.
9. Report of Gage-Babcock & Associates, Inc., on the Wincrest and Cermak Nursing Home fires, March 1976.
10. Report of the Department of Commerce's National Bureau of Standards on "Proposed Changes to Nursing Home Standards Resulting from the Recent Chicago Fires," March 25, 1976.
11. Report of the National Commission on Fire Prevention and Control "America Burning," May 4, 1973.

Appendix II: PENDING CONGRESSIONAL LEGISLATION
TO REQUIRE AUTOMATIC SPRINKLER SYSTEMS IN
NURSING HOMES

94TH CONGRESS
2D SESSION

H. R. 14406 **

IN THE HOUSE OF REPRESENTATIVES

JUNE 16, 1976

Mr. PEPPER introduced the following bill; which was referred jointly to the
Committees on Ways and Means and Interstate and Foreign Commerce

A BILL

To amend the Social Security Act to require automatic sprinkler systems in all nursing facilities and intermediate care facilities certified for participation in the medicare or medicaid program, and to provide for direct low-interest Federal loans to assist such facilities in constructing or purchasing and installing automatic sprinkler systems.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*
3 That section 1861 (j) of the Social Security Act is
4 amended—

5 (1) by striking out “except that the Secretary may
6 waive” in paragraph (13) and inserting in lieu thereof

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**Cosponsored as of September 16, 1976, by 89 Members of the House of Representatives.

1 “except that (subject to the last paragraph of this sub-
2 section) the Secretary may waive”; and

3 (2) by adding at the end thereof the following new
4 paragraph:

5 “No waiver of or exemption from the requirement of the
6 Life Safety Code that all nursing homes be fully protected
7 on all floors with an automatic sprinkler system shall be
8 allowed under paragraph (13) with respect to any facility
9 on the basis of construction classification; and no such waiver
10 shall be granted on any other basis unless a certification has
11 been made to the Secretary, by a person qualified in fire
12 protection engineering, that the facility meets all of the
13 conditions and standards established by the Secretary for
14 such waiver. The conditions and standards established by
15 the Secretary under the preceding sentence shall insure that
16 any facility with respect to which a waiver from the auto-
17 matic sprinkler requirement is granted will be otherwise
18 protected from fire, and that such waiver will not adversely
19 affect the health and safety of the patients. Such conditions
20 and standards shall be established by the Secretary within
21 six months of the date of enactment of the Act.”.

22 SEC. 2. (a) 1902 (a) (28) of the Social Security Act
23 is amended by inserting after “requirements contained in
24 section 1861 (j),” the following: “including specifically a
25 provision that any such facility (and any other nursing fa-

1 facility receiving such payments) must satisfy all of the re-
2 quirements with respect to automatic sprinkler systems
3 which are imposed by or under paragraph (13) and the last
4 paragraph of that section;”.

5 (b) Clause (3) in the first sentence of section 1905 (c)
6 of such Act is amended by the striking out “meets such
7 standards” and inserting in lieu thereof “meets the same
8 requirements with respect to automatic sprinkler systems as
9 those which are imposed upon skilled nursing facilities by
10 section 1902 (a) (28), and meets such other standards”.

11 SEC. 3. (a) In order to assist long-term care facilities
12 in protecting the health and safety of their patients and
13 residents in a manner which complies with the applicable
14 requirements of Federal law, the Secretary of Health, Edu-
15 cation, and Welfare (hereinafter referred to as the “Secre-
16 tary”) is authorized to make loans to such facilities as pro-
17 vided in this section for the construction or purchase and
18 installation of automatic sprinkler systems.

19 (b) A loan under this section may be made only to an
20 eligible facility (as defined in subsection (c)), and only for
21 the purpose of assisting such facility in constructing or pur-
22 chasing and installing an automatic sprinkler system which
23 complies with the requirements imposed by or under para-
24 graph (13) of section 1861 (j) of the Social Security Act
25 (and the last paragraph of such section), or the requirements

1 of section 1902 (a) (28) or 1905 (c) (3) of such Act, as
2 may be applicable. Any such loan shall—

3 (1) be in such amount as may be reasonable and
4 necessary, in addition to any other funds available to
5 the facility, to construct or purchase and install such
6 system, as determined in accordance with regulations
7 prescribed by the Secretary;

8 (2) bear interest at a rate not exceeding 6 per
9 centum per annum on the outstanding balance;

10 (3) have a maturity, not to exceed twenty years,
11 as determined by the Secretary on the basis of the fa-
12 cility's ability to repay and the projected useful life of
13 the structure or structures involved; and

14 (4) be subject to such additional terms, conditions,
15 and provisions as the Secretary may impose in order to
16 assure that the objectives of this section and the pur-
17 poses of the medicare and medicaid programs will be
18 effectively carried out.

19 Each application for a loan under this section shall be ac-
20 companied by certification to the Secretary that the installa-
21 tion will be made in accordance with the standards estab-
22 lished by the National Fire Protection Association (Number
23 13, 1975 edition). No such application shall be approved
24 unless such certification is made to the Secretary.

25 (c) As used in this section, the term "eligible facility"

1 means a skilled nursing facility, nursing home, or intermedi-
2 ate care facility (within the meaning of title XVIII or XIX
3 of the Social Security Act) which has been certified for par-
4 ticipation in the medicare program under such title XVIII
5 or in a medical assistance program under a State plan
6 approved under such title XIX, or which is seeking or pro-
7 poses to seek such certification.

8 (d) There are authorized to be appropriated such sums
9 as may be necessary for purposes of this section. Amounts
10 so appropriated shall be placed in and constitute a revolving
11 fund which shall be available to the Secretary for use in
12 carrying out this section.

13 SEC. 4. The amendments made by the first two sections
14 of this Act—

15 (1) shall apply with respect to all facilities on which
16 construction is commenced on or after the first day of
17 the sixth month following the month in which this Act
18 is enacted; and

19 (2) shall apply with respect to all facilities already
20 in existence (or on which construction is commenced
21 before the first day of such sixth month) effective from
22 and after the first day of the eighteenth month following
23 the month in which this Act is enacted.

94TH CONGRESS
2D SESSION

H. R. 15576

IN THE HOUSE OF REPRESENTATIVES

SEPTEMBER 15, 1976

Mr. HEINZ introduced the following bill; which was referred jointly to the Committees on Ways and Means, Interstate and Foreign Commerce, and Veterans' Affairs

A BILL

To require automatic sprinkler systems in all skilled nursing facilities and intermediate care facilities as a condition of certification under the medicare, medicaid, and Veterans' Administration programs, and to authorize loans and grants to assist such facilities in purchasing and installing such systems.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*
3 That, (a) notwithstanding any other provision of law (ex-
4 cept subsection (b) of this section), no nursing facility shall
5 be certified as a skilled nursing facility for purposes of par-
6 ticipation in the hospital insurance program under title
7 XVIII of the Social Security Act, no nursing facility or

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1 intermediate care facility shall be certified or approved for
2 purposes of participation in a medical assistance program
3 under a State plan approved under title XIX of such Act,
4 and no nursing facility or intermediate care facility shall be
5 approved for participation in any program under the juris-
6 diction of the Veterans' Administration, for any period be-
7 ginning on or after the expiration of two years from the date
8 of the enactment of this Act, unless such facility has a
9 sprinkler system which is determined by the Secretary of
10 Health, Education, and Welfare, hereinafter in this Act
11 referred to as the "Secretary", or the Administrator of
12 Veterans' Affairs (as the case may be) to satisfy the appli-
13 cable requirements of standard numbered 13 of the 1975
14 edition of the National Fire Protection Association (and
15 such later editions as the Secretary may determine).

16 (b) The Secretary may waive this requirement only in
17 cases where because the size or nature of the structure of the
18 skilled nursing facility or intermediate care facility, the in-
19 stallation of a complete sprinkler system would constitute an
20 unreasonable hardship. In such cases, the Secretary shall
21 require such compensatory fire protection features as he
22 deems appropriate for the size and nature of the structure.

23 SEC. 2. (a) For the purpose of assisting skilled nursing
24 and intermediate care facilities in protecting the health and
25 safety of their patients and in meeting the requirements of

1 Federal law relating thereto, the Secretary is authorized,
2 in the manner provided in section 1620 of the Public Health
3 Service Act and subject to the conditions and requirements
4 of that section except to the extent inconsistent with the
5 succeeding provisions of this section, to make loans to such
6 facilities to assist them in financing part or all of the cost
7 of purchasing and installing automatic sprinkler systems.

8 (b) A loan under this section may be made only to an
9 eligible skilled nursing or intermediate care facility (as de-
10 fined in subsection (c)), and only for the purpose of assisting
11 such facility in purchasing and installing an automatic
12 sprinkler system which satisfies the applicable requirements
13 of standard numbered 13 of the 1975 edition of the National
14 Fire Protection Association (and such later editions as the
15 Secretary may determine). Any such loan shall—

16 (1) be in such amount as may be reasonable and
17 necessary, in addition to any other funds available to the
18 facility, to purchase and install such system, as deter-
19 mined in accordance with regulations prescribed by the
20 Secretary;

21 (2) bear interest at a rate not more than 1 per
22 centum higher than the average outstanding discount rate
23 (at the time the loan is made) of the Federal Reserve
24 bank for the district in which the facility involved is
25 located;

1 (3) have a maturity of not more than twenty years;

2 and

3 (4) be subject to such additional terms, conditions,
4 and provisions as the Secretary may impose in order to
5 assure that the objectives of this section will be effective-
6 ly carried out.

7 Each application for a loan under this section shall not be
8 subject to approval under section 1604 of the Public Health
9 Service Act. No such application shall be approved unless the
10 Secretary finds that (A) the structure involved has a
11 projected useful life as a skilled nursing care facility or inter-
12 mediate care facility of at least ten years and is otherwise
13 qualified for certification under title XVIII or XIX of the
14 Social Security Act or approved for participation in any pro-
15 gram under the jurisdiction of the Veterans' Administration.

16 (c) As used in this section, the term "eligible skilled
17 nursing or intermediate care facility" means a skilled nursing
18 facility within the meaning of section 1861 (j) of the Social
19 Security Act, or an intermediate care facility within the
20 meaning of section 1905 (c) of such Act, which—

21 (1) has been certified for participation in the medi-
22 care program under title XVIII of such Act or in a
23 medical assistance program under a State plan approved
24 under title XIX of such Act, or is seeking or proposing to
25 seek such certification;

1 (2) does not have in operation a complete auto-
2 matic sprinkler system and is unable (as determined by
3 the Secretary) to obtain from private sources all of the
4 financing needed to purchase and install such a system.

5 (d) There are authorized to be appropriated such sums
6 as may be necessary for purposes of this section. Amounts so
7 appropriated shall be placed in and constitute a revolving
8 fund which shall be available to the Secretary for use in
9 carrying out this section.

10 SEC. 3. (a) In the case of an eligible skilled nursing or
11 intermediate care facility (as defined in section 2 (c)) and:

12 (1) serves a primarily rural, medically underserved,
13 or low-income population,

14 (2) at least 85 per centum of the patients or resi-
15 dents of which are recipients of medical assistance under
16 a State plan approved under title XIX of the Social
17 Security Act,

18 (3) is unable to underwrite the costs of purchasing
19 and installing an automatic sprinkler system through its
20 own financial resources, including its endowment if any,
21 and

22 (4) is either a publicly owned and operated facility
23 or a facility described in section 501 (c) (3) or (4) of
24 the Internal Revenue Code of 1954 which is exempt
25 from income taxes under section 501 (a) of such Code.

1 the Secretary is authorized, in the manner provided in sec-
2 tion 1625 of the Public Health Service Act and subject to
3 the conditions and requirements of such section except to the
4 extent inconsistent with the provisions of this section, to make
5 a grant or grants to such facility to enable it to purchase and
6 install an automatic sprinkler system satisfying the applicable
7 requirements of standard numbered 13 of the 1975 edition
8 of the National Fire Protection Association (or such later
9 editions as the Secretary may prescribe) .

10 (b) Grants under this section—

11 (1) may be made in lieu of or in supplementation
12 of such loans; and

13 (2) shall be subject to such terms and conditions as
14 the Secretary may prescribe to assure that the objectives
15 of this section are effectively carried out.

16 (c) There are authorized to be appropriated such sums
17 as may be necessary to enable the Secretary to carry out this
18 section.

19 SEC. 4. No later than ninety days after the date of the
20 enactment of this Act, the Secretary shall prescribe and pub-
21 lish such regulations as may be necessary or appropriate to
22 carry out this section.

23 SEC. 5. Except as otherwise provided in the first section
24 of this Act, the provisions of this Act shall take effect on the
25 date of its enactment.

Appendix III

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS
June 3, 1976

FEDERAL FIRE SAFETY REQUIREMENTS DO
NOT INSURE LIFE SAFETY IN NURSING
HOME FIRES
Social and Rehabilitation Service
Department of Health, Education, and
Welfare

D I G E S T

As a result of two nursing facility fires that killed 31 people during early 1976, the Chairman, Subcommittee on Health and Long-Term Care, House Select Committee on Aging, asked GAO to investigate reasons for the severity of the fires and to suggest possible actions to avoid similar situations.

According to reports of investigations:

- Multiple deaths occurred in these and several fires in prior years even though the buildings were of fire resistive construction and were in substantial compliance with the Federal fire safety requirements.
- Deaths were caused by smoke and products of combustion rather than by flames because the flames were confined to the rooms of origin.
- Neither facility was fully protected with an automatic sprinkler system designed to activate an alarm and begin fighting the fire immediately.
- Although local fire departments responded promptly to both alarms, the fire departments were unable to prevent the deaths which occurred.
- Facility employees tried to evacuate residents and extinguish the fires, but in neither case were they successful in preventing death or extinguishing the fires.
- Although a short period of time elapsed from the identification of the fires to

the arrival of the fire departments, the fires generated intense heat, resulting in considerable fire damage to the rooms in which the fires originated.

--Experts said automatic sprinklers would have prevented the deaths in these homes.

Studies by congressional committees, a fire safety engineering firm, a special investigative committee, and others have pointed out the need for and the benefits of automatic sprinkler systems in nursing facilities.

GAO determined that the cost of sprinkler system installations ranged from \$393 to \$625 a bed. The amortized cost of \$625 over a 20-year period with a 9-1/4 percent interest rate is \$5.57 a bed each month, or about 19¢ a bed each day.

With the installation of a sprinkler system, savings on nursing facility fire insurance premiums are possible on both the building and its contents. Through reimbursement for depreciation and interest, Medicare and Medicaid will pay for part of the cost of sprinkler system installation.

The program which authorized the Department of Housing and Urban Development to provide Federal loan insurance for the installation of fire safety equipment has not been utilized. GAO believes that excessive processing time by HEW and the Department of Housing and Urban Development procedures, which prohibit loan insurance after work has begun, contribute to the problems facing nursing facilities applying for loan insurance.

GAO recommends that the Secretary of HEW minimize the problem of excessive processing time by establishing procedures which make better use of existing survey and certification documents.

GAO recommends that the Secretary of Housing and Urban Development

- establish regulations to permit fire safety equipment loan insurance after work has begun
- publicize the availability of the fire safety equipment loan insurance program by revising the nursing home brochure dealing with nursing home mortgage insurance.

Because congressional hearings were scheduled, the chairman's office requested that GAO not delay the report to get formal comments from HEW and the Department of Housing and Urban Development. Informal comments from agency officials were considered where appropriate in this report. The National Fire Protection Association and the National Fire Prevention and Control Administration of the Department of Commerce agreed with GAO's recommendations to the Congress.

RECOMMENDATIONS TO THE CONGRESS

GAO believes that a strong case can be made for requiring that all nursing facilities be fully protected with automatic sprinkler systems. Therefore, in line with previous recommendations of congressional committees, we recommend that the Congress enact legislation which will require that all nursing facilities be fully protected with an automatic sprinkler system. The Congress should require HEW to establish rigid standards which must be met by nursing facilities requesting waiver from the automatic sprinkler requirement.



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